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Modeling of Simulated Photochemical Smog with Kinetic Mechanisms. Volume 2. Interim Report Appendix

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Prepared for

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16. ABSTRACT

Computer modeling of smog chamber data is discussed in three parts. First, a series of detailed chemical mechanisms were developed to describe the photochemical formation of ozone from nitrogen oxides and the following organic compounds (alone and in various combinations): formaldehyde, acetaldehyde, ethylene, propylene, butane, 1-butene, trans-2-butene, and 2,3-dimethylbutane. Second, a generalized kinetic scheme intended for use in models simulating the formation of ozone in urban atmospheres was refined. The generalized mechanism includes a condensed version of the detailed mechanisms developed in the first part plus a semi-empirical scheme to describe the oxidation of aromatic hydrocarbons. Third, the effects of smog chambers on ozone formation were examined. For this part of the study, similar experiments using nitrogen oxides and propylene in eight different smog chambers were simulated using the detailed propylene mechanism. The main chamber effects identified thus far are apparently due to nitrogen oxides degassing from the walls during experiments and differences between chambers in the spectral distribution of ultraviolet irradiation.

Volume 1 contains all textual material. Volume 2 contains graphs of measured and simulated pollutant concentrations for many smog chamber experiments.

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Volume 2.
Interim Report
Appendix

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EPA-600/3-79-001b
January 1979

MODELING OF SIMULATED PHOTOCHEMICAL SMOG WITH KINETIC MECHANISMS

Volume 2. Interim Report Appendix

by

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ENVIRONMENTAL SCIENCES RESEARCH LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NORTH CAROLINA 27711

1a

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ABSTRACT

Computer modeling of smog chamber data is discussed in three parts. First, a series of detailed chemical mechanisms were developed to describe the photochemical formation of ozone from nitrogen oxides and the following compounds (alone and in various combinations): formaldehyde, acetaldehyde, ethylene, propylene, butane, 1-butene, trans-2-butene, and 2,3-dimethylbutane. The aldehyde mechanisms were verified independently using data from experiments containing only nitrogen oxides and the appropriate aldehyde. The hydrocarbon mechanisms were then developed by adding the chemical reactions detailing the photooxidation steps of the particular hydrocarbon to the aldehyde mechanisms. Second, a generalized kinetic scheme intended for use in models simulating the formation of ozone in urban atmospheres was refined. The generalized mechanism includes a condensed version of the explicit mechanisms developed in the first part plus a semi-emipirical scheme to describe the oxidation of aromatic hydrocarbons. Third, the effects of smog chambers on ozone formation were examined. For this part of the study, similar experiments using propylene and nitrogen oxides in eight different smog chambers were simulated. The main chamber effects identified thus far are apparently due to nitrogen oxides degassing from the walls during experiments and differences between chambers in the spectral distribution of ultraviolet irradiation.

Volume 1 contains all textual material; this volume contains graphs of measured and simulated pollutant concentrations for many smog chamber experiments. The two-volume report was submitted to the U.S. Environmental Protection Agency in fulfillment of Contract No. 68-02-2428 by Systems Applications, Incorporated. This report covers the period 23 August 1976 to 23 August 1978, and work was completed as of 18 August 1978.

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ABBREVIATIONS

ALD2	Acetaldehyde
ALD3	Propionaldehyde
ALD4	Butyraldehyde
AONE	Acetone
ARO	Aromatics
BLA	Blacklamp irradiation
BUT	n-Butane
BUT1	1-Butene
BUT2	Trans-2-butene
CO	Carbon monoxide
C2N3	Ethyl nitrate
C4N3	n-Butyl nitrate
C6N3	2,3-Dimethylbutyl nitrate
DBUT	2,3-Dimethylbutane
EC	Evacuable chamber (at UCR)
ETH	Ethylene
FORM	Formaldehyde
HCHO	Formaldehyde
H2O2	Hydrogen peroxide
MEK	Methylethylketone
MEN3	Methyl nitrate
NO	Nitrogen oxide
NOX	Oxides of nitrogen (NO + NO_2)
NO2	Nitrogen dioxide
O3	Ozone
OLE	Olefins
PAN	Peroxyacetyl nitrate
PAR	Paraffins
PPN	Peroxypropionyl nitrate
PROP	Propylene
SCN3	Sec-butyl nitrate
SPN3	Isopropyl nitrate
SUN	Sunlamp irradiation
SUNLAMP	Sunlamp irradiation
UCR	University of California at Riverside
UNCB	University of North Carolina ("blue" side of chamber)
UNCR	University of North Carolina ("red" side of chamber)

APPENDIX

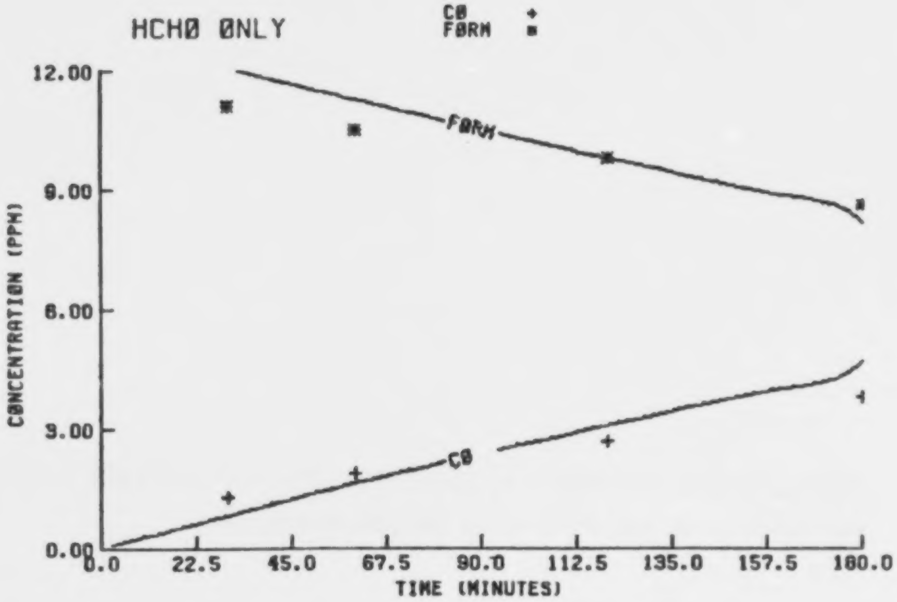
SIMULATION RESULTS

Volume I of this two-volume report discusses the results of this study. This volume (II) is the data volume: It presents graphs of simulated and measured pollutant concentrations in smog chamber experiments. In all figures, the symbols represent measured concentrations and the solid lines represent simulation concentrations. The pollutants are identified in the graphs by two- to four-space codes, which are given in the list of abbreviations. Simulations with explicit mechanisms (Part A) are presented first, followed by simulations with the Carbon-Bond Mechanism (Part B), and simulations with the explicit propylene mechanism in the study of chamber effects (Part C).

Part A

Simulation Results with Explicit Mechanisms

FORMALDEHYDE EXPERIMENTS BY BUFALINI, GAY, AND BRUBAKER (1972).
Simulated with explicit formaldehyde mechanism.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CO +
FORM *
12.00
9.00
6.00
3.00
0.00
CONCENTRATION (PPM)
FORM
CO
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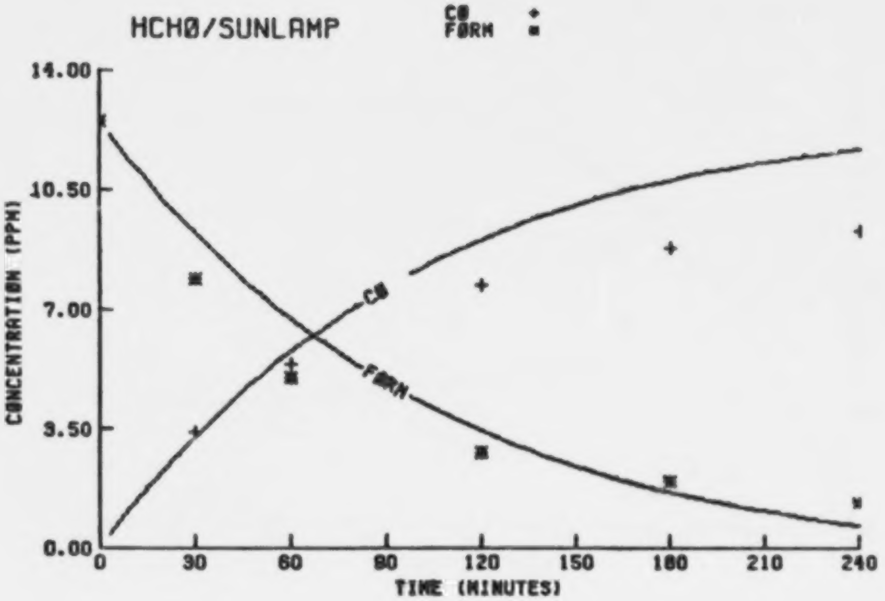
22.5
45.0
67.5
90.0
112.5
135.0
157.5
180.0
TIME (MINUTES)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C0 +
F0RM ■
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7.00
3.50
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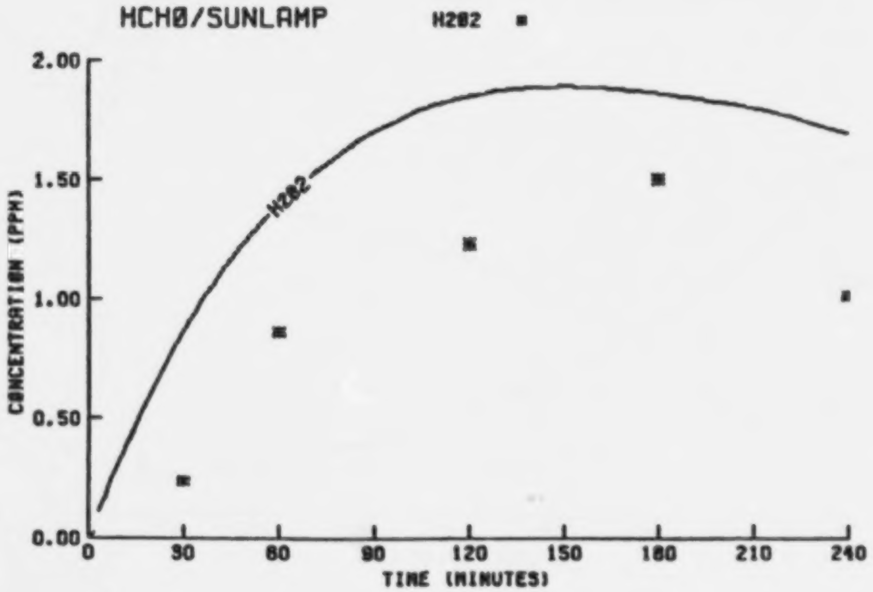
60
90
120
150
180
210
240
TIME (MINUTES)
C0
F0RM


HCH0/SUNLAMP
H202 ■
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1.00
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60
90
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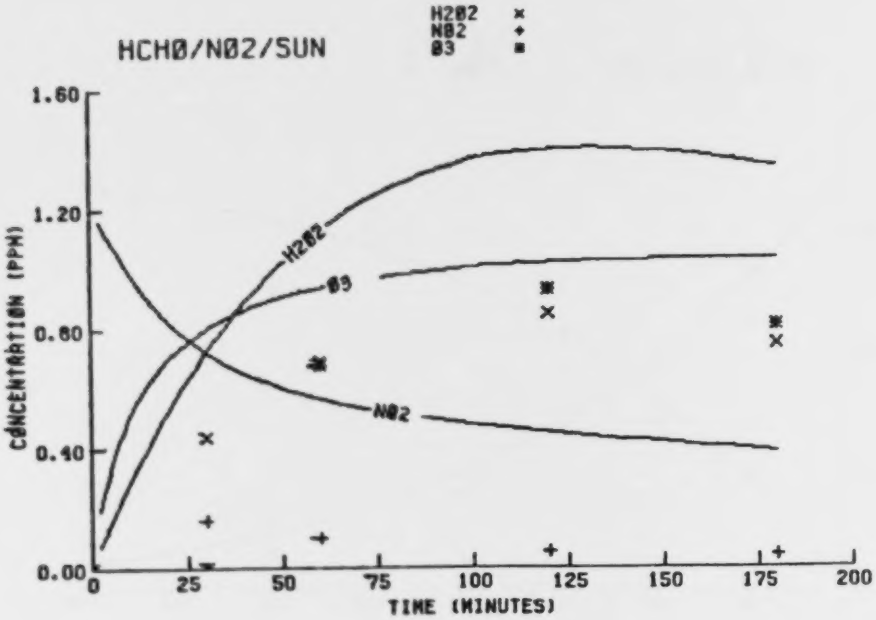
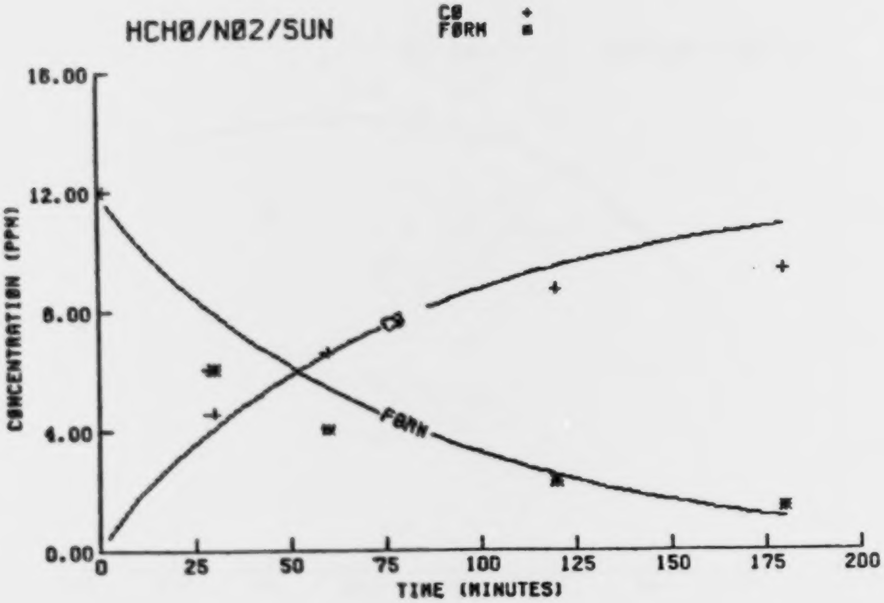
150
180
210
240
TIME (MINUTES)
H202


HCHO/NO2/SUN
H2O2 ×
NO2 +
O3 ✱
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
H2O2
O3
NO2
0
25
50
75
100
125
150
175
200
TIME (MINUTES)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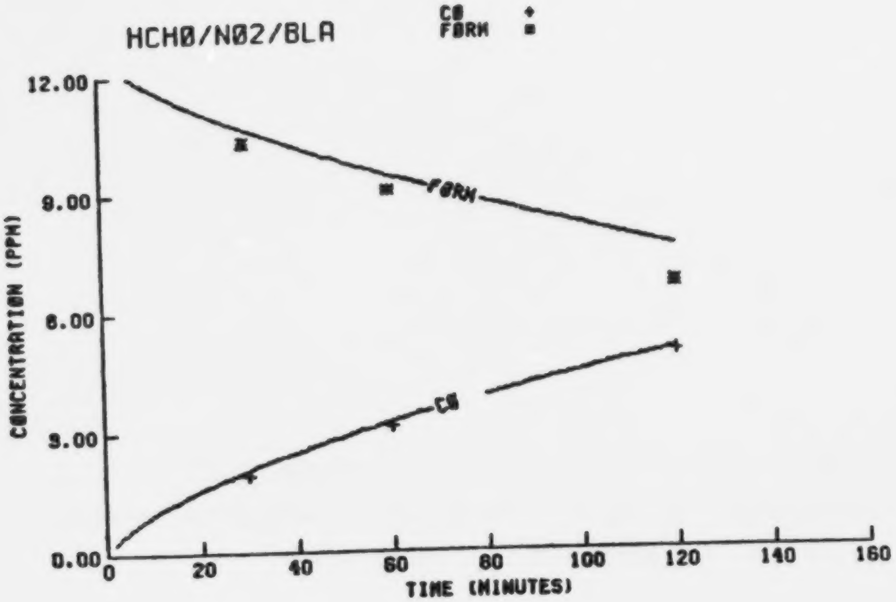
CO +
FORM ✱
16.00
12.00
8.00
4.00
0.00
CONCENTRATION (PPM)
CO
FORM
0
25
50
75
100
125
150
175
200
TIME (MINUTES)


HCHO/NO2/BLA
CO +
FORM ✱
FORM
CO
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9.00
6.00
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0.00
CONCENTRATION (PPM)
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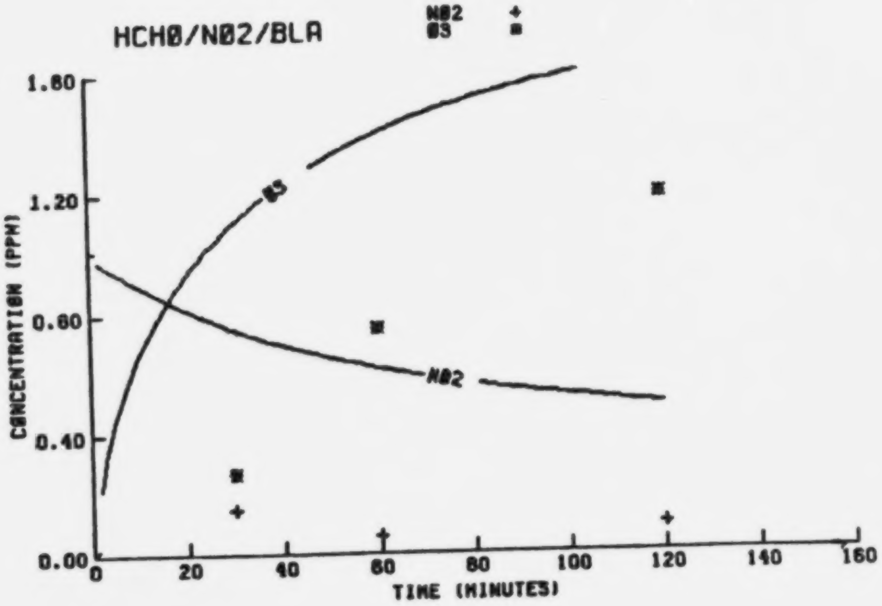
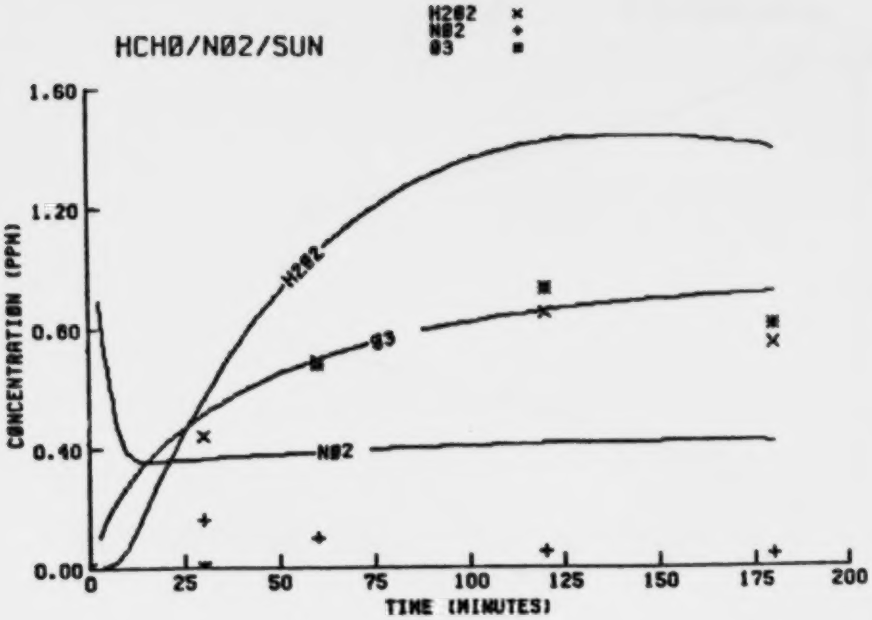
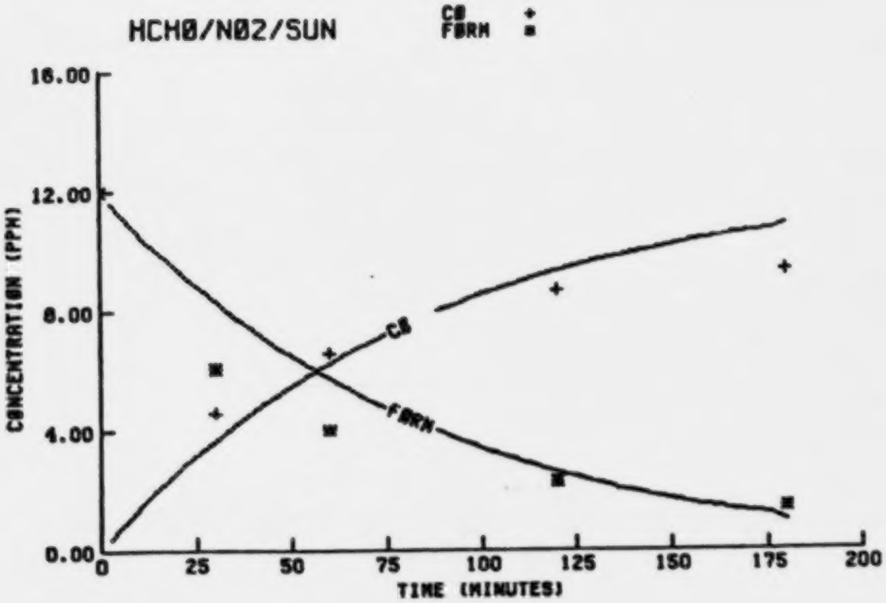
20
40
60
80
100
120
140
160
TIME (MINUTES)


HCHO/NO2/BLA
NO2 +
O3 ✱
O3
NO2
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
0
20
40
60
80
100
120
140
160
TIME (MINUTES)

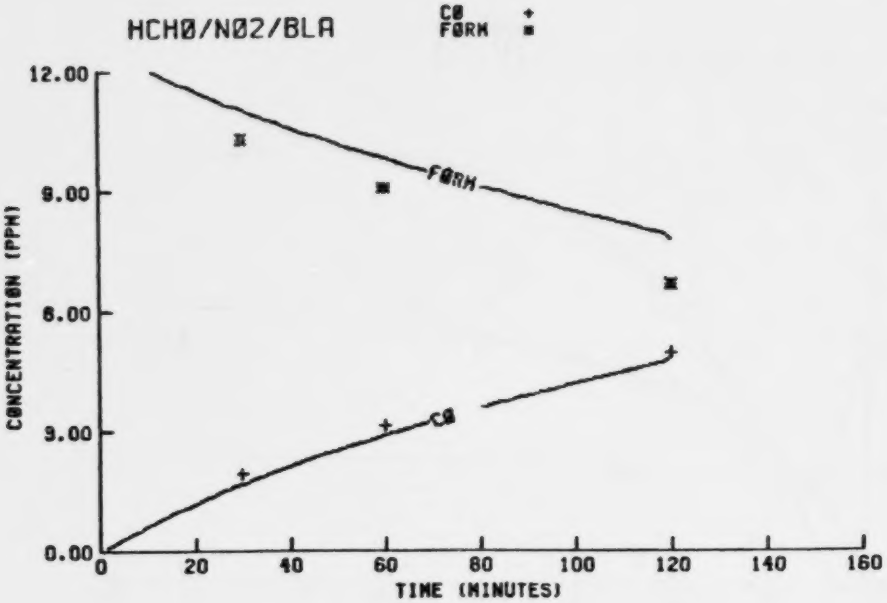
EXPERIMENTS BY BUFALINI, GAY, AND BRUBAKER (1972).
Simulated with explicit formaldehyde mechanism with added
reactions for peroxynitric acid ($HOONO_2$).



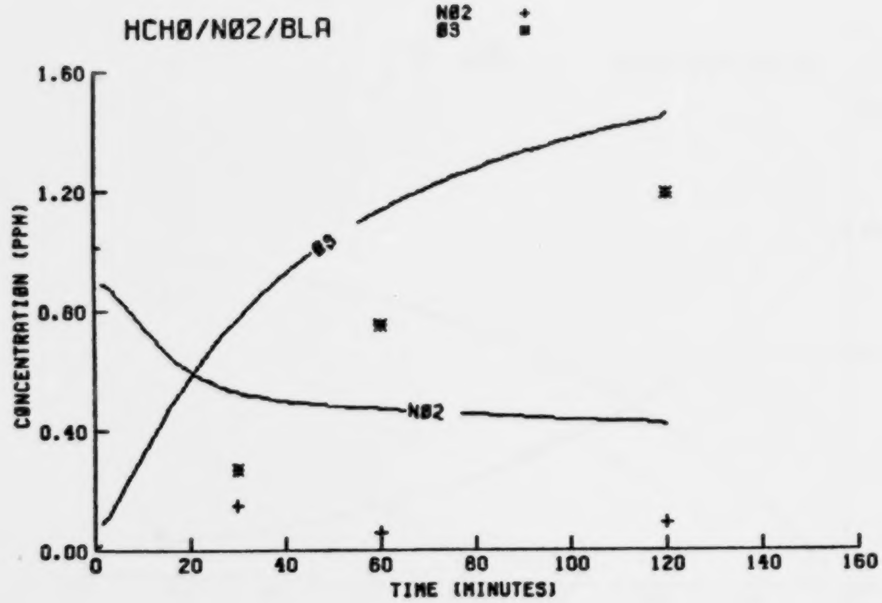
HCHO/NO2/SUN
H2O2 ×
NO2 +
O3 ■
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
H2O2
O3
NO2
0
25
50
75
100
125
150
175
200
TIME (MINUTES)



HCHO/NO2/SUN
CO +
FORM ■
16.00
12.00
8.00
4.00
0.00
CONCENTRATION (PPM)
CO
FORM
0
25
50
75
100
125
150
175
200
TIME (MINUTES)



HCHO/NO2/BLA
CO +
FORM ■
12.00
9.00
6.00
3.00
0.00
CONCENTRATION (PPM)
FORM
CO
0
20
40
60
80
100
120
140
160
TIME (MINUTES)



HCHO/NO2/BLA
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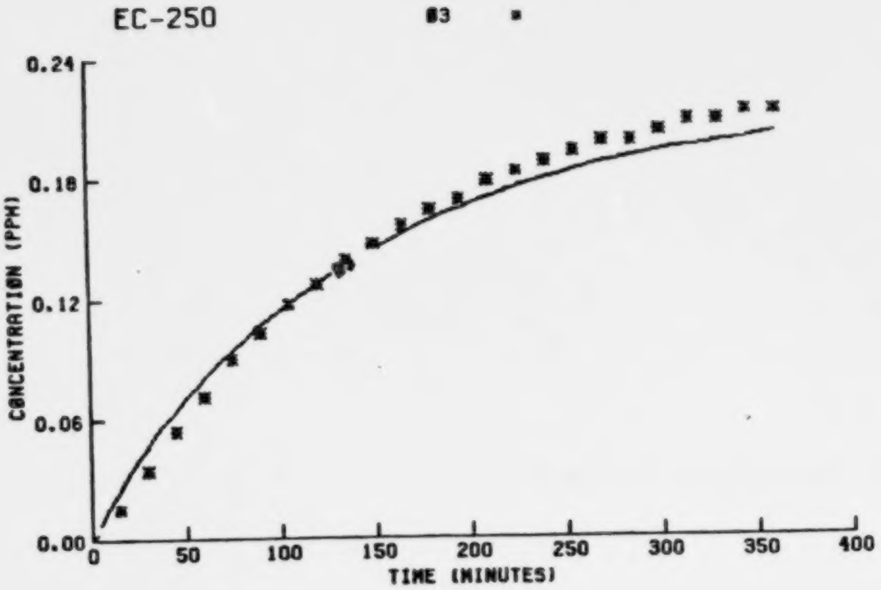
O3 ■
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
O3
NO2
0
20
40
60
80
100
120
140
160
TIME (MINUTES)

UCR FORMALDEHYDE EXPERIMENTS



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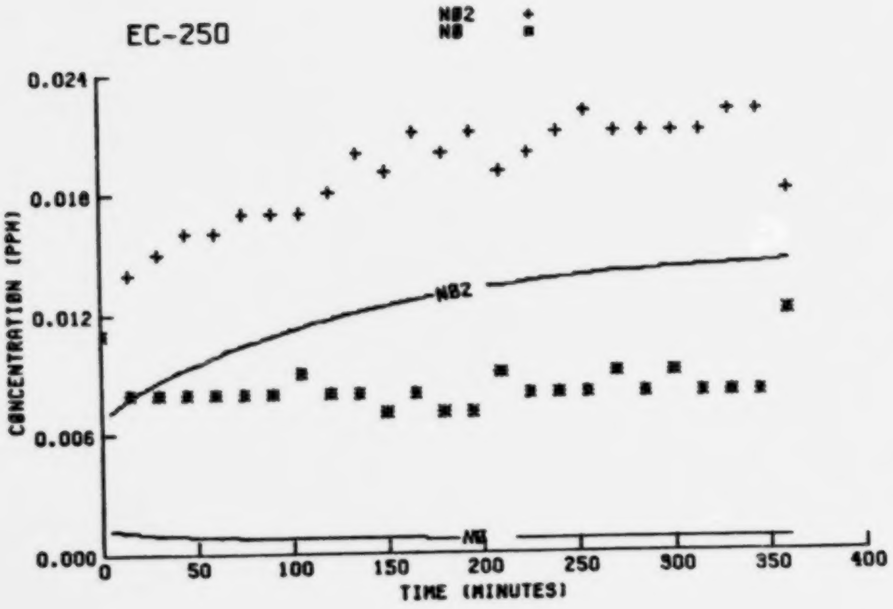
TIME (MINUTES)



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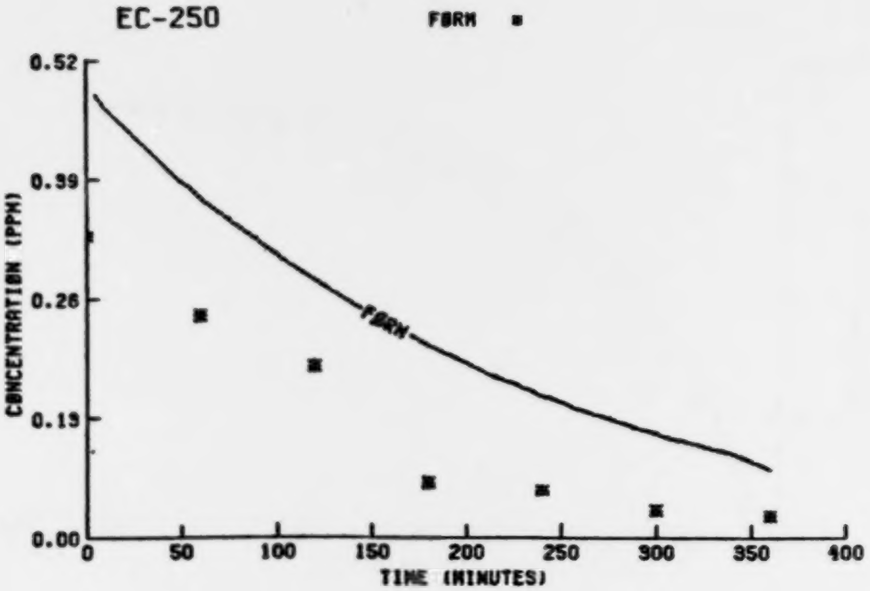

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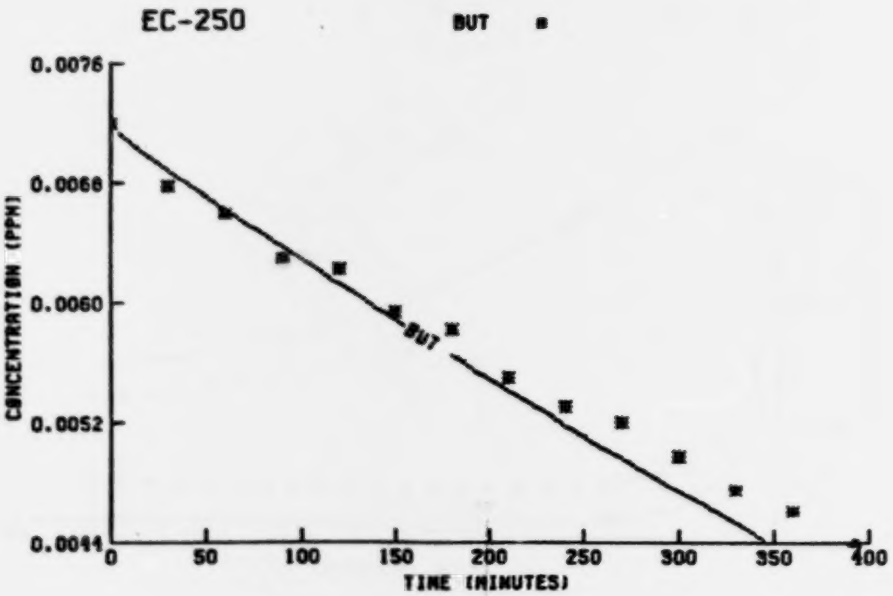

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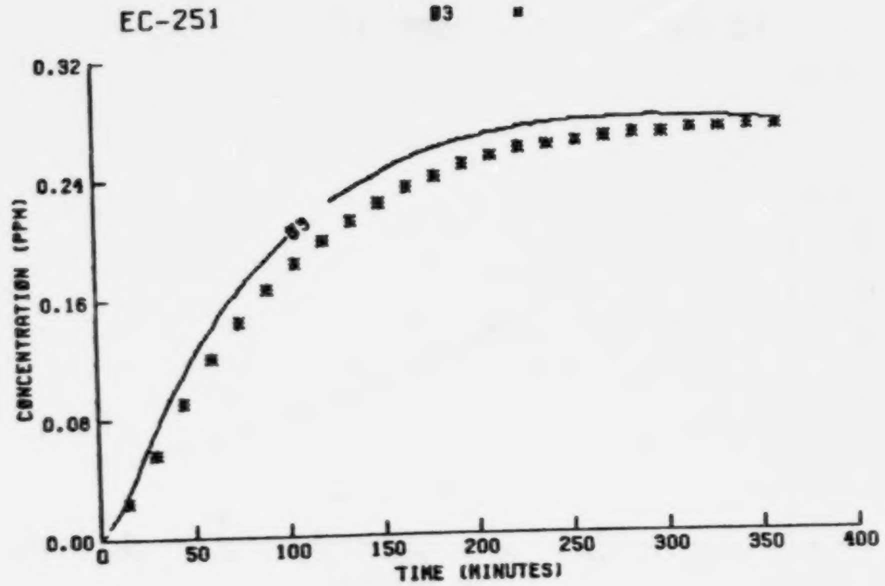
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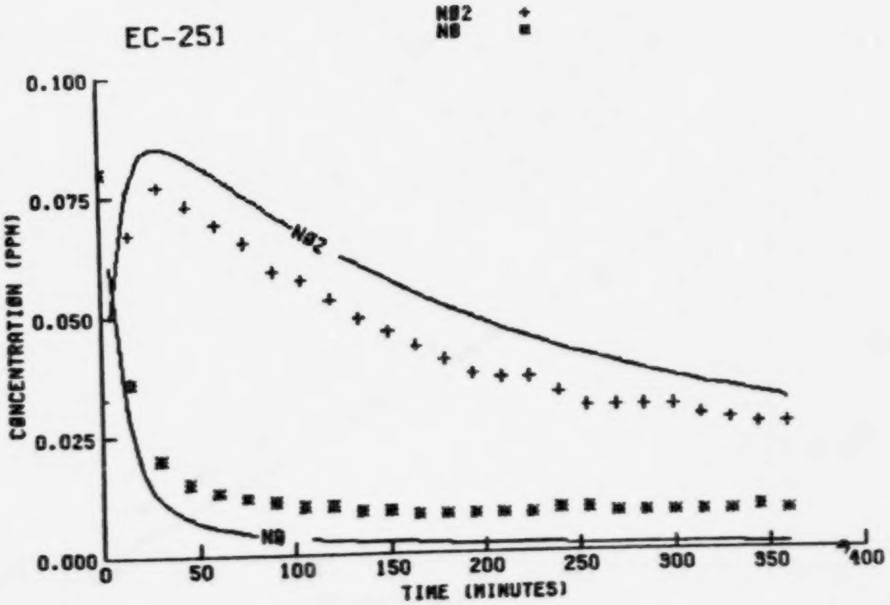
TIME (MINUTES)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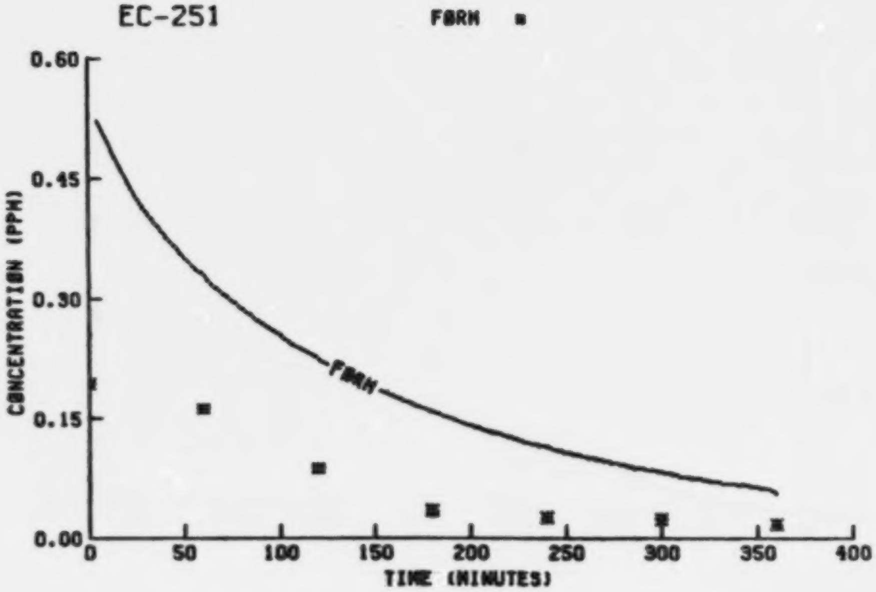
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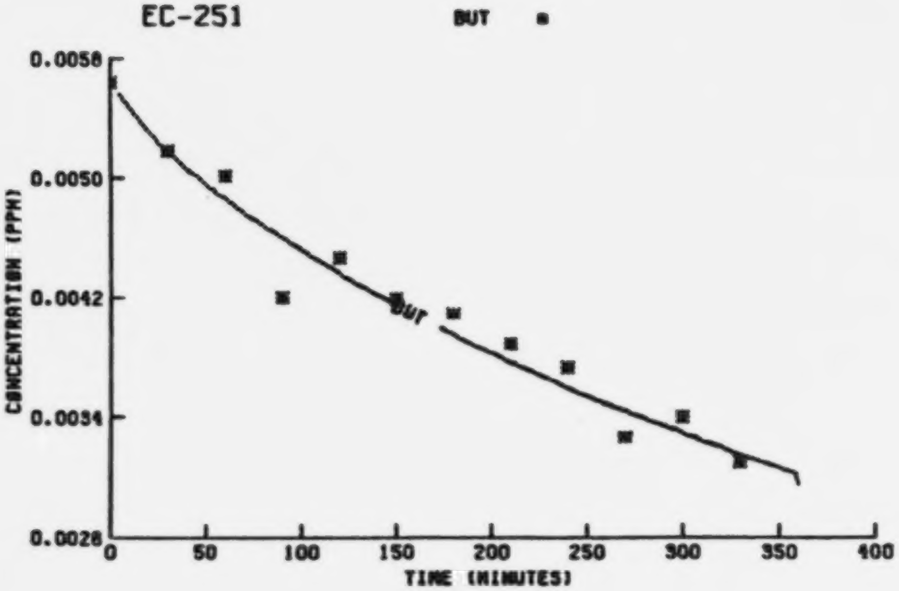
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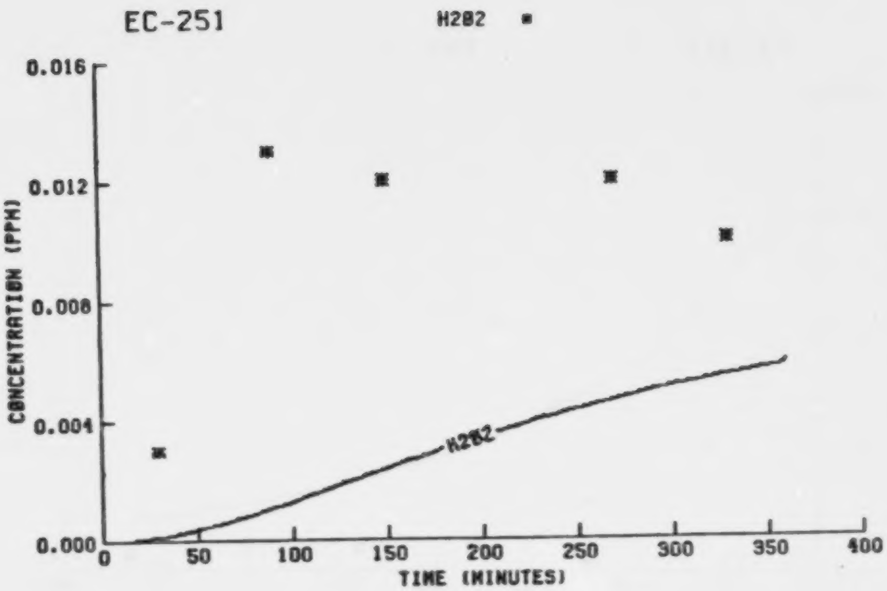
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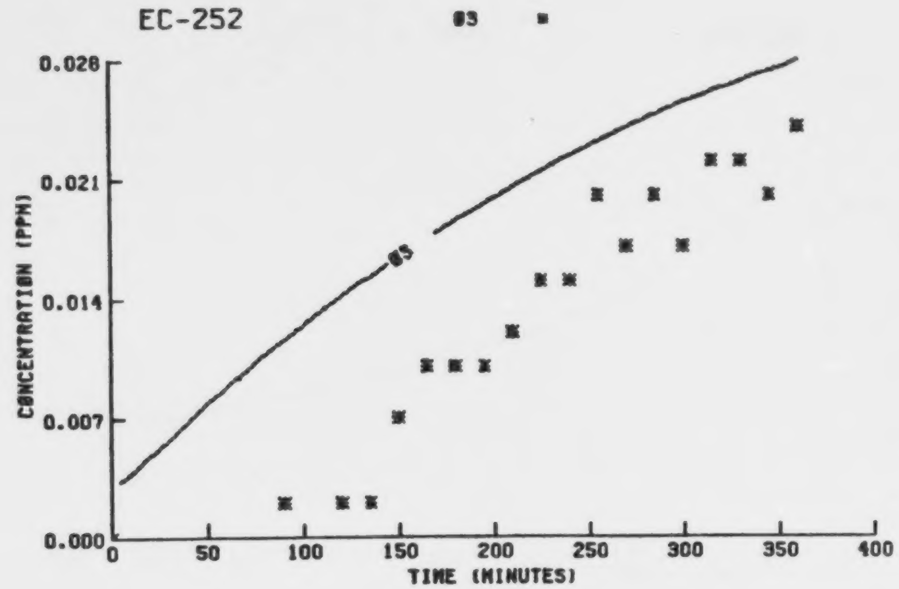
H2O2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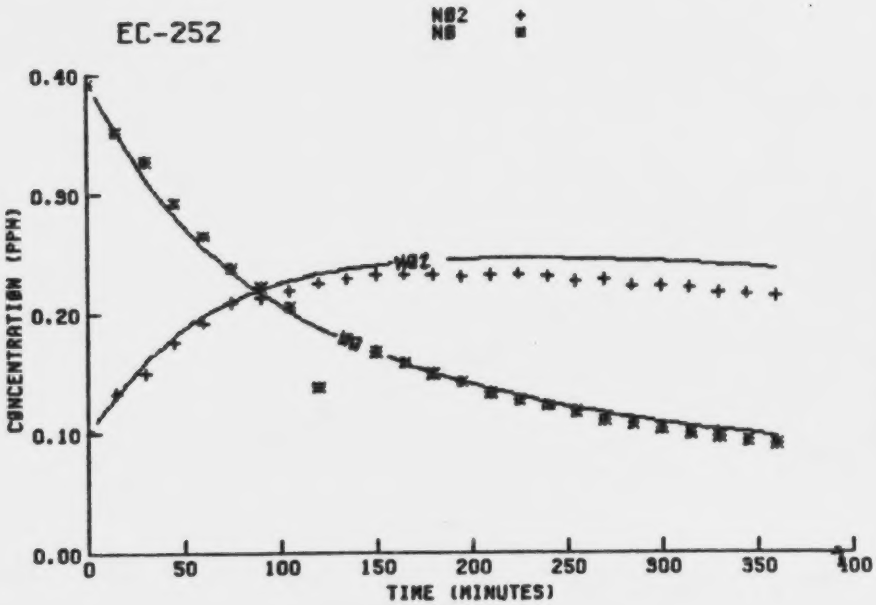
200
250
300
350
400
TIME (MINUTES)


EC-252
NO2 +
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0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
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NO
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100
150
200
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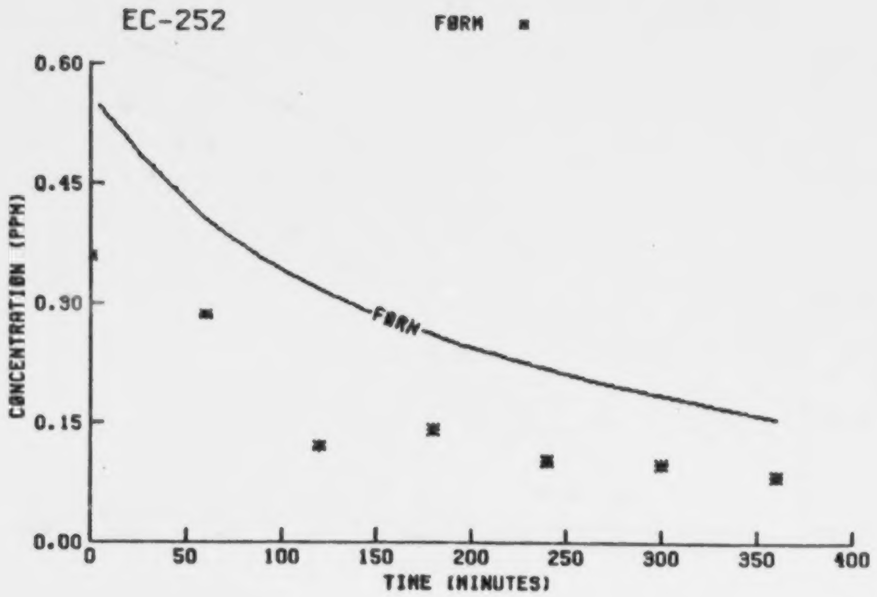
300
350
400
TIME (MINUTES)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FØRM ✱
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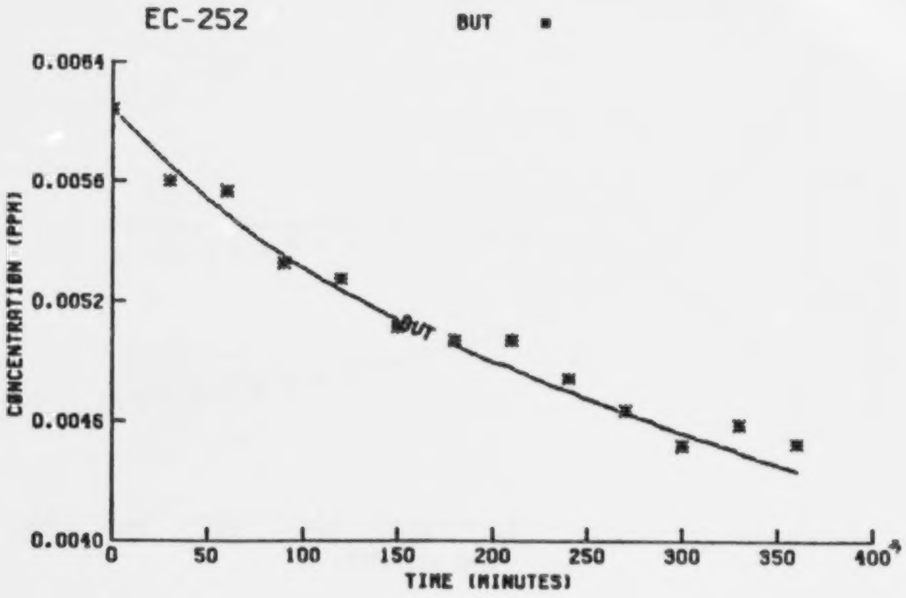
TIME (MINUTES)


EC-252
BUT ✱
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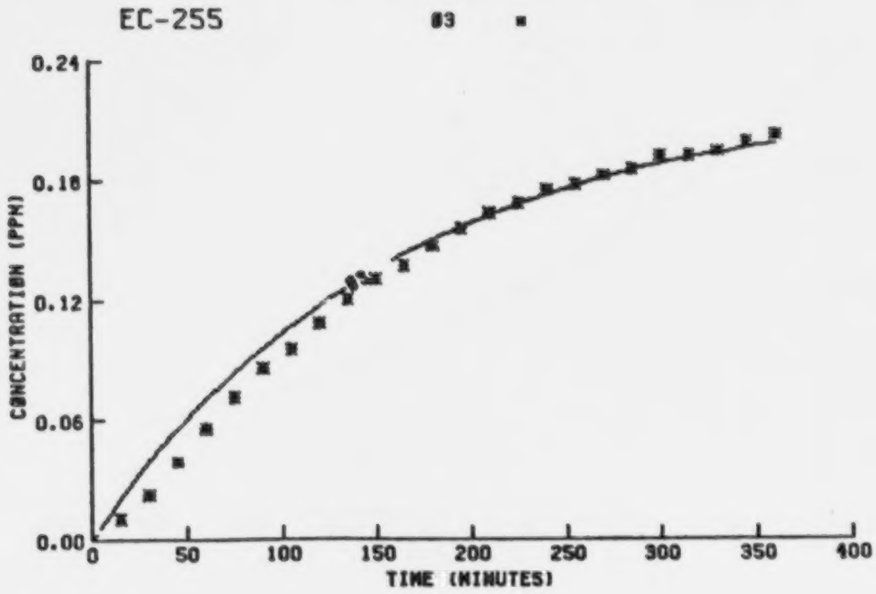
TIME (MINUTES)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CONCENTRATION (PPM)
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0
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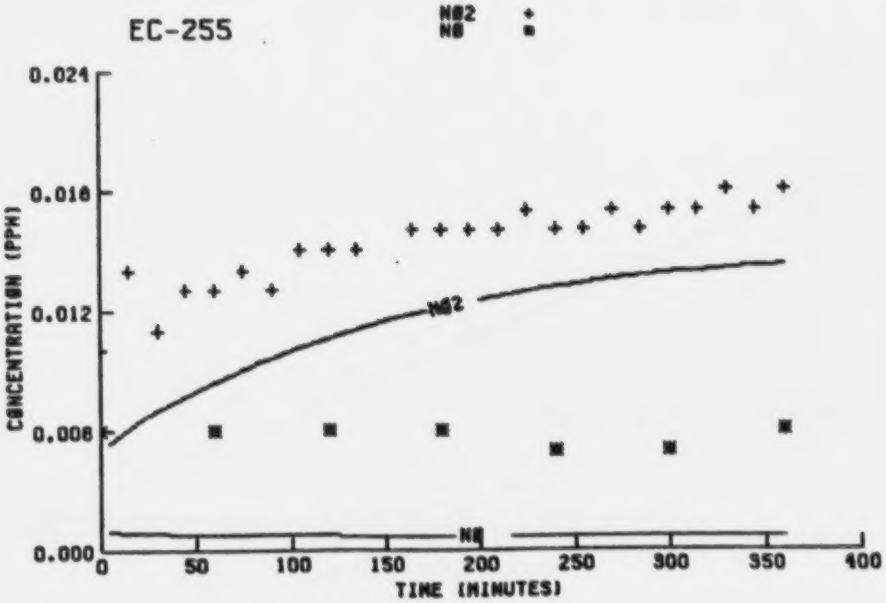
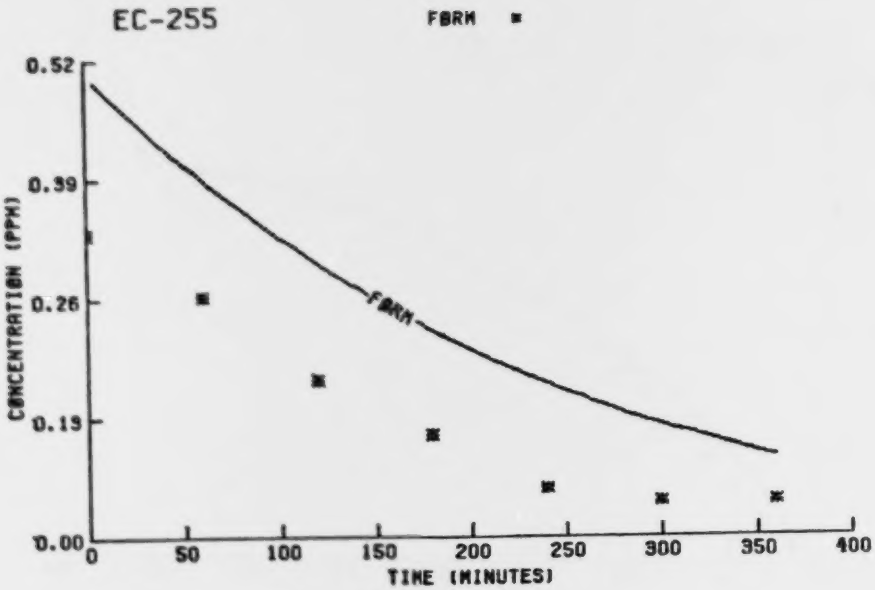
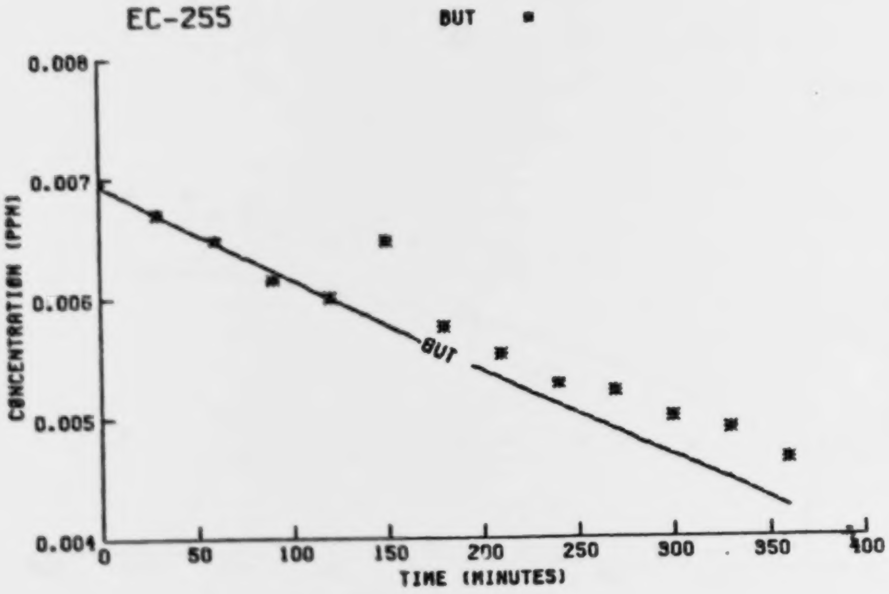
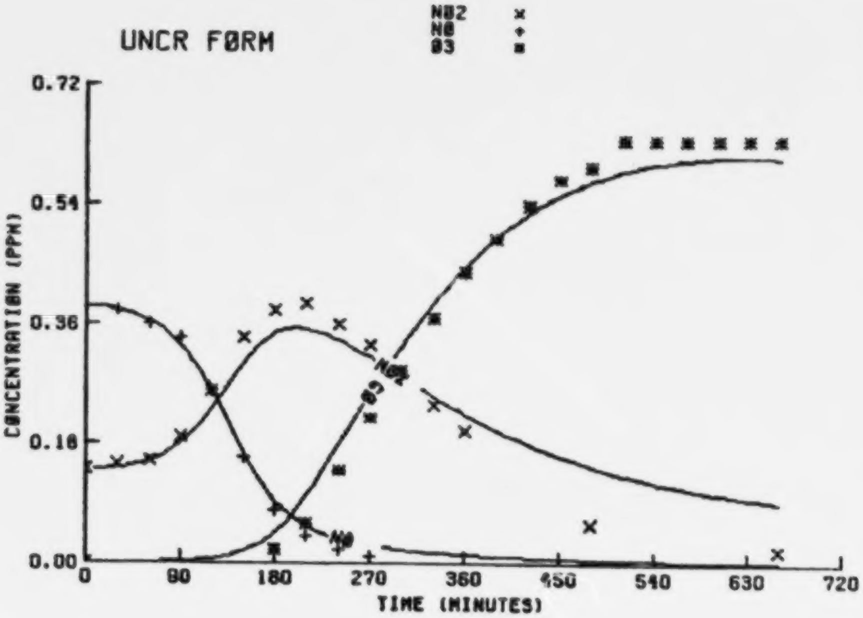
200
250
300
350
400
TIME (MINUTES)

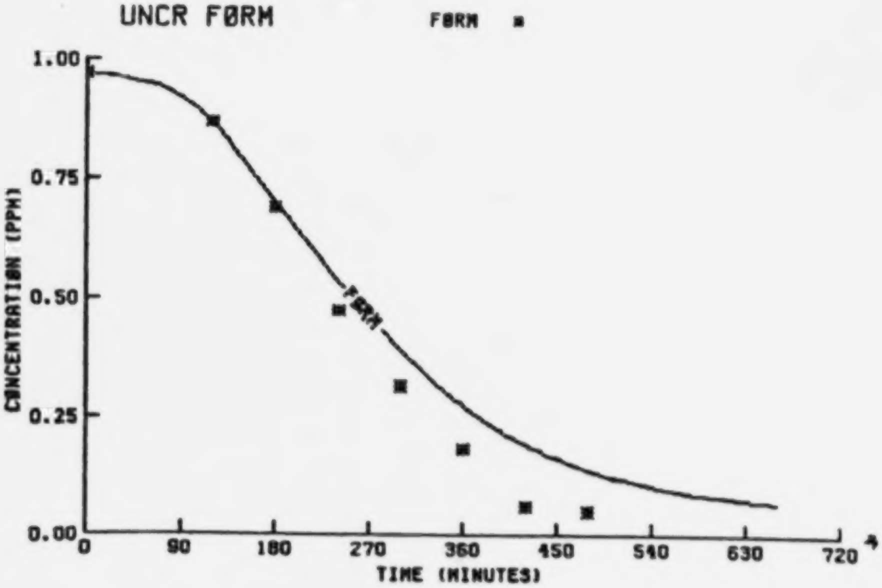

EC-255
NO2 +
NO ■
0.024
0.018
0.012
0.006
0.000
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-255
FØRM *
0.52
0.39
0.26
0.13
0.00
CØNCENTRATIØN (PPM)
FØRM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

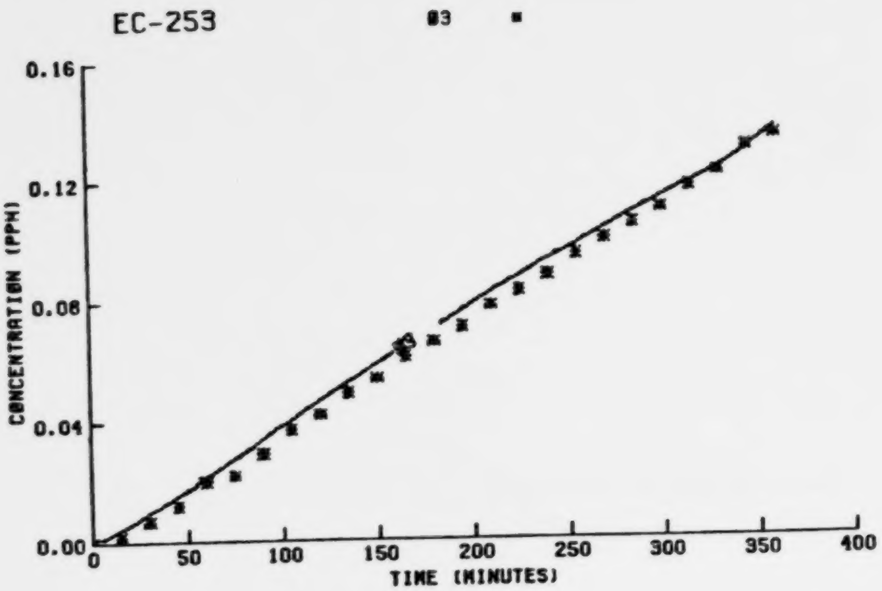

EC-255
BUT *
0.008
0.007
0.006
0.005
0.004
CØNCENTRATIØN (PPM)
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

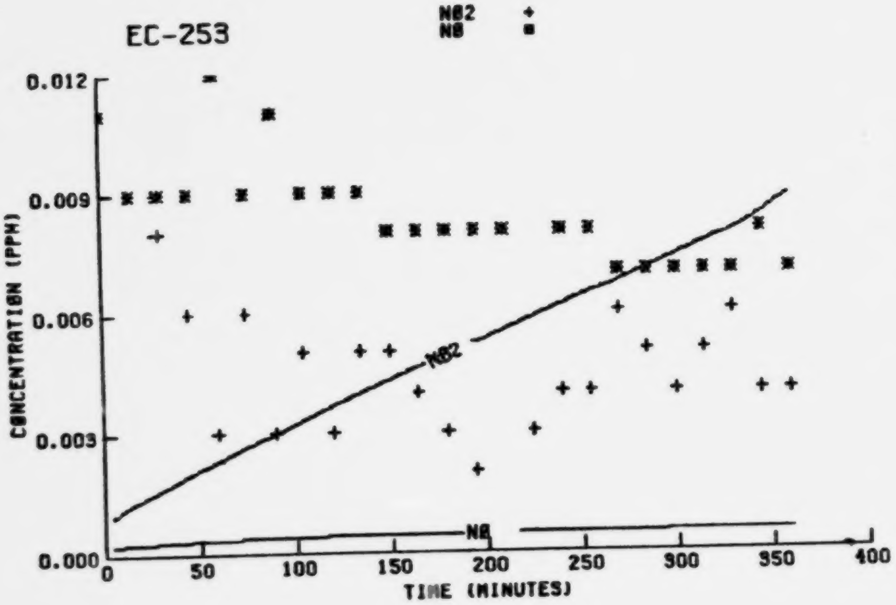
UNC FORMALDEHYDE EXPERIMENT

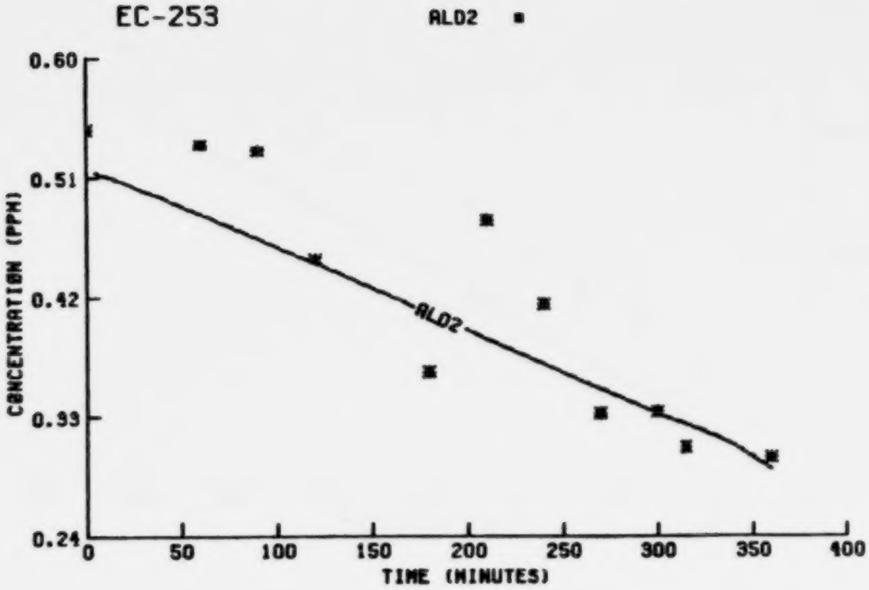

UNCR FØRM
NØ2 ×
NØ +
Ø3 ∗
0.72
0.54
0.36
0.18
0.00
CØNCENTRATIØN (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
NØ2
Ø3
NØ

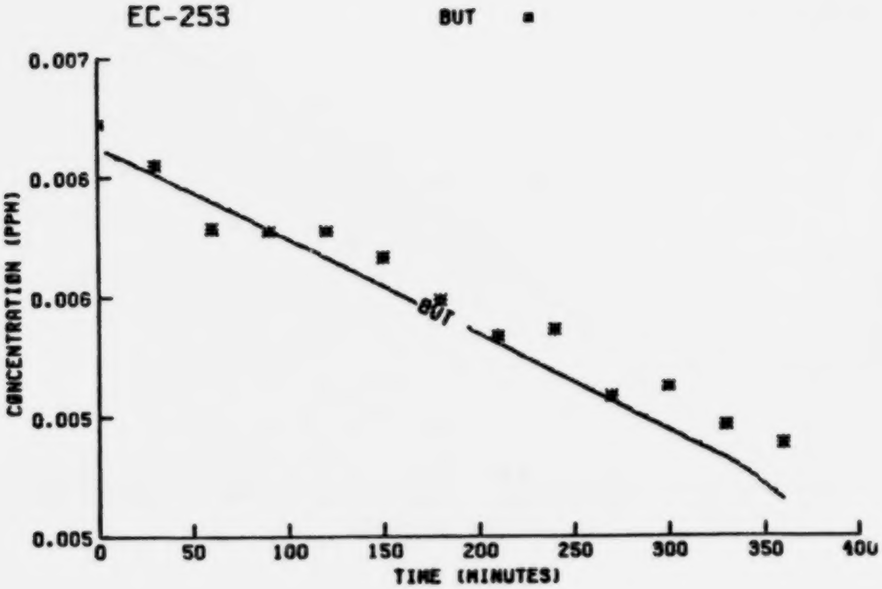

UNCR FØRM
FØRM ∗
1.00
0.75
0.50
0.25
0.00
CØNCENTRATIØN (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
FØRM

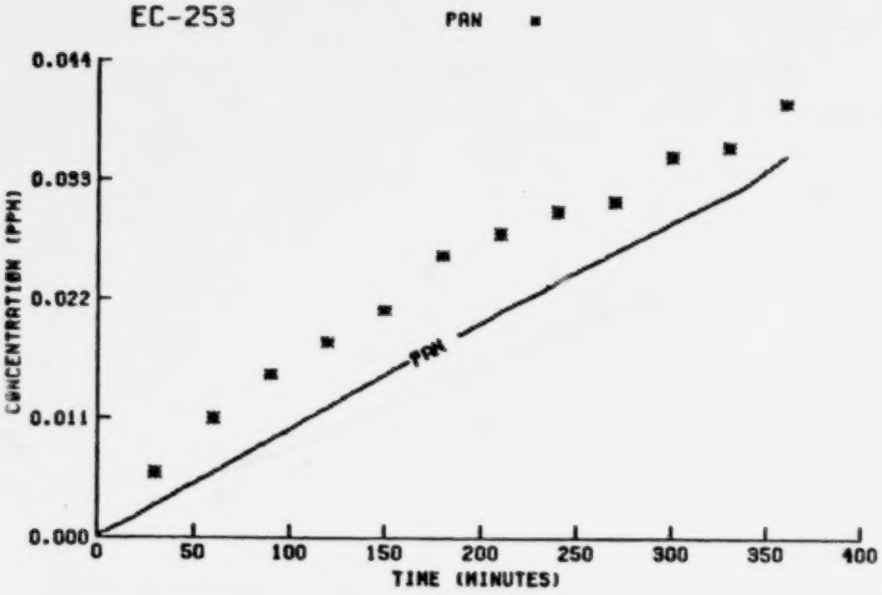
UCR ACETALDEHYDE EXPERIMENTS


EC-253
O3
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3

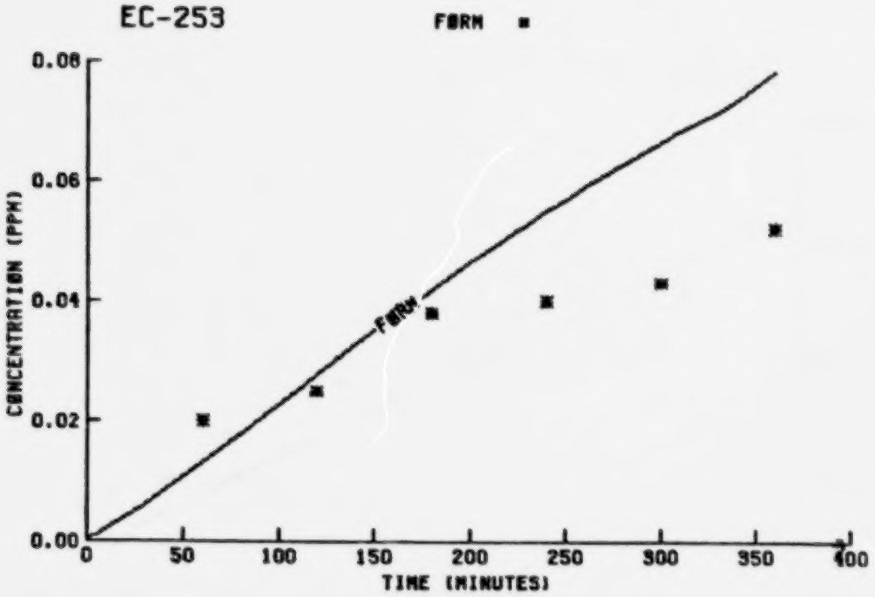

EC-253
NO2 +
NO
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-253
ALD2 ■
0.60
0.51
0.42
0.33
0.24
CONCENTRATION (PPM)
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

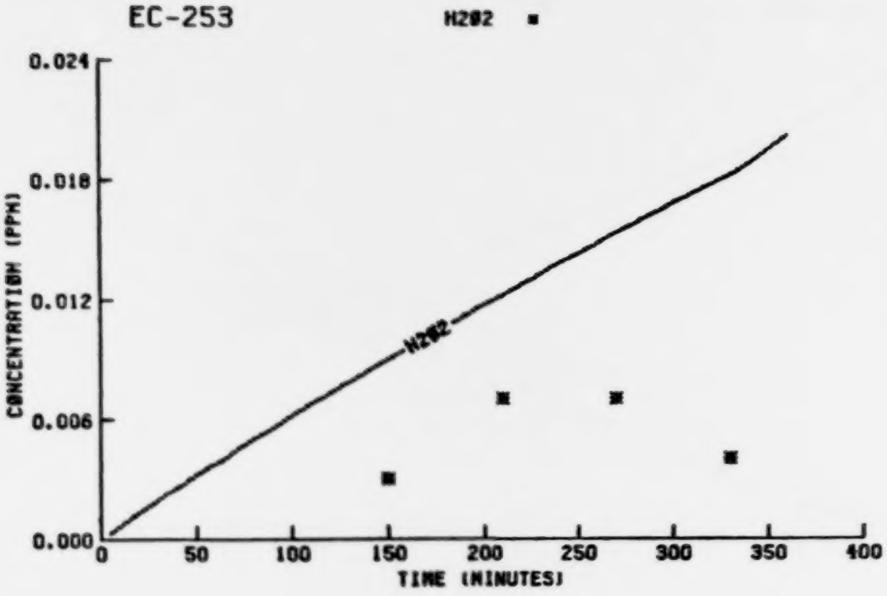

EC-253
BUT ■
0.007
0.006
0.006
0.005
0.005
CONCENTRATION (PPM)
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

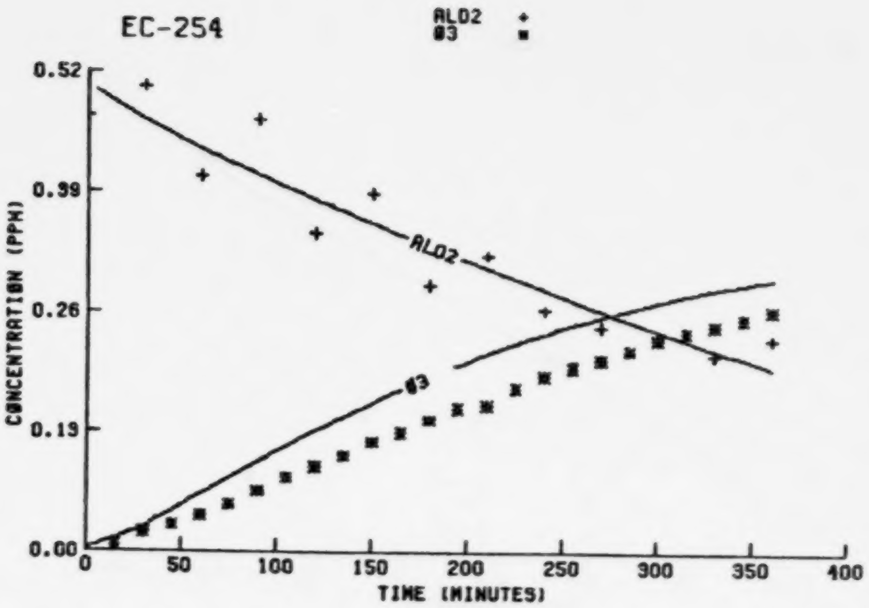


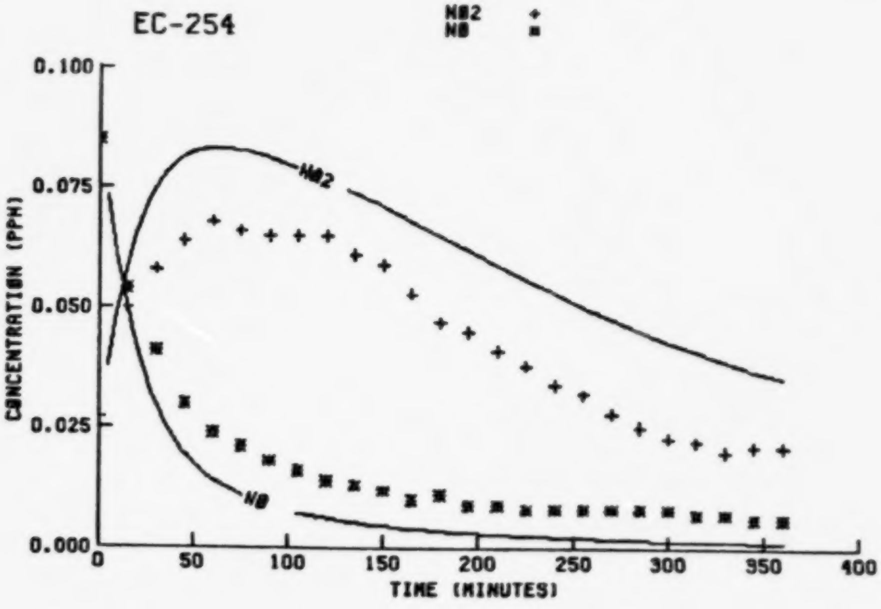
EC-253
PAN ■
0.044
0.033
0.022
0.011
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

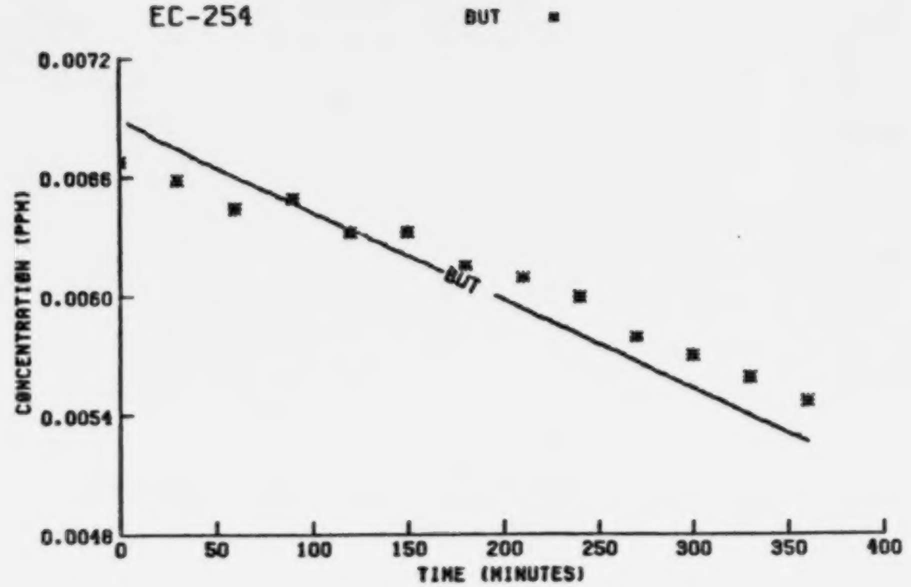


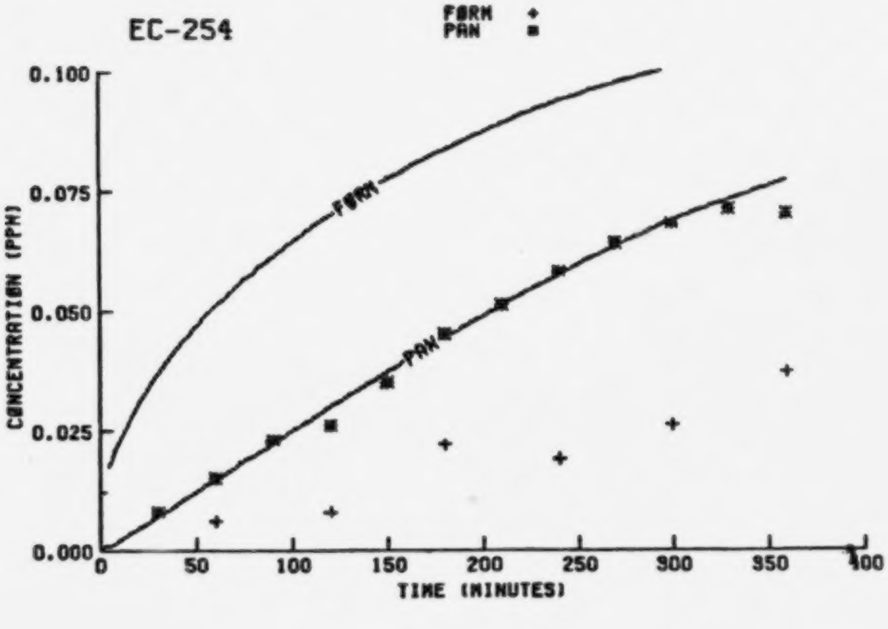
EC-253
FORM ■
0.08
0.06
0.04
0.02
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM

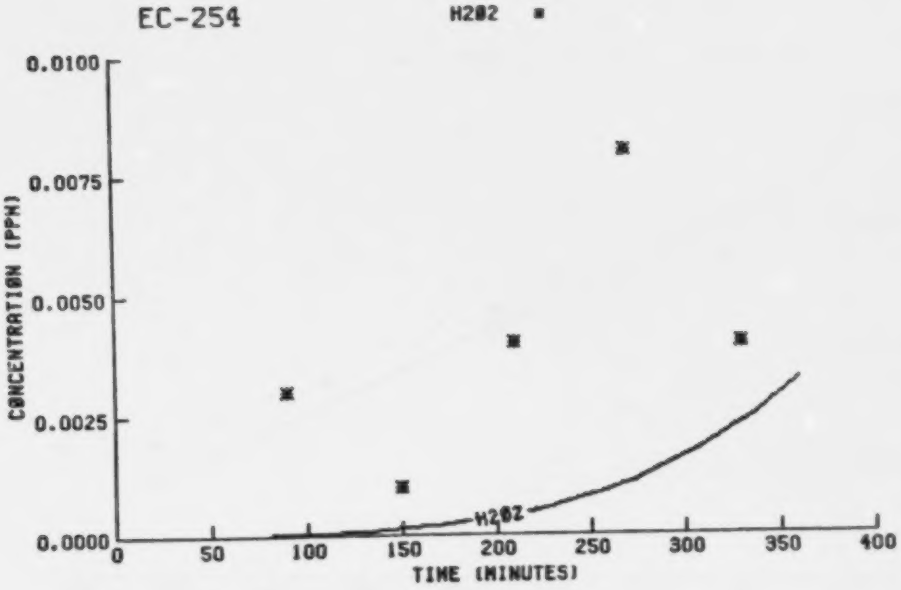

EC-253
H2O2 ■
CONCENTRATION (PPM)
0.000
0.006
0.012
0.018
0.024
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
H2O2


EC-254
ALD2 +
O3 ■
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
O3

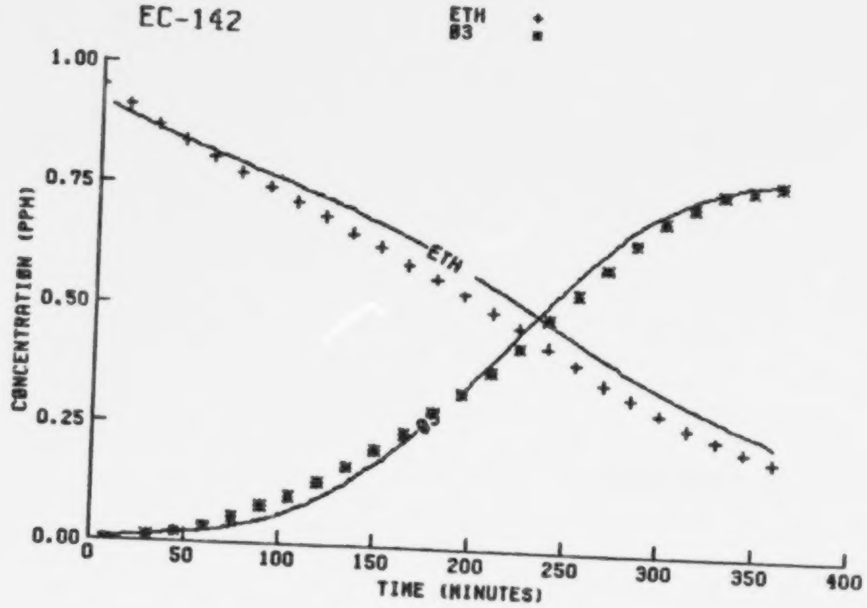

EC-254
NO2 +
NO ■
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

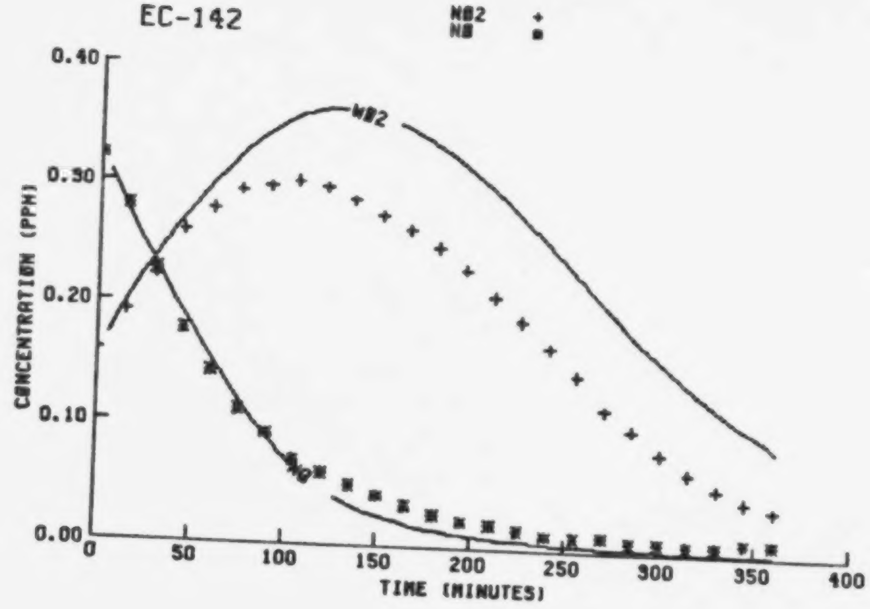

EC-254
BUT
0.0072
0.0066
0.0060
0.0054
0.0048
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

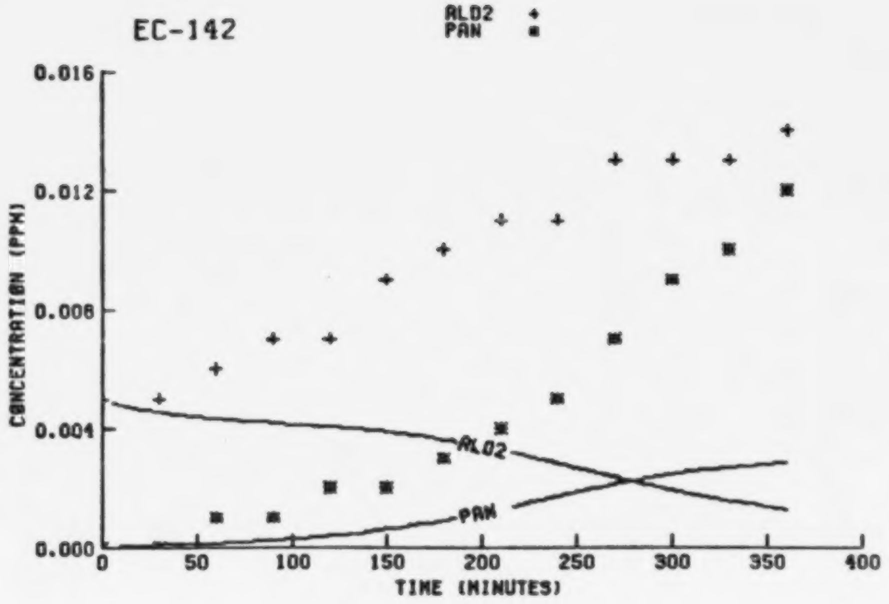

EC-254
FORM +
PAN
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PAN

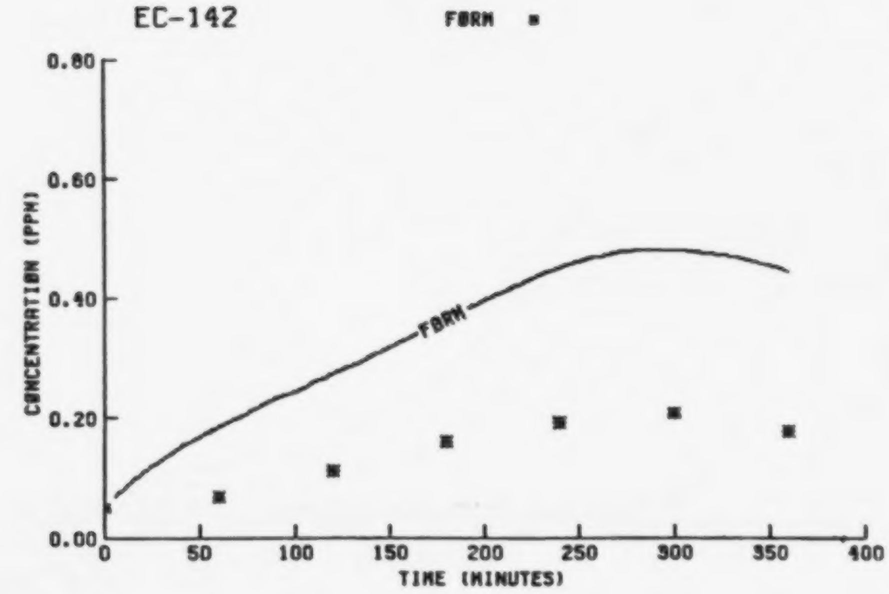

EC-254
H2O2
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
H2O2

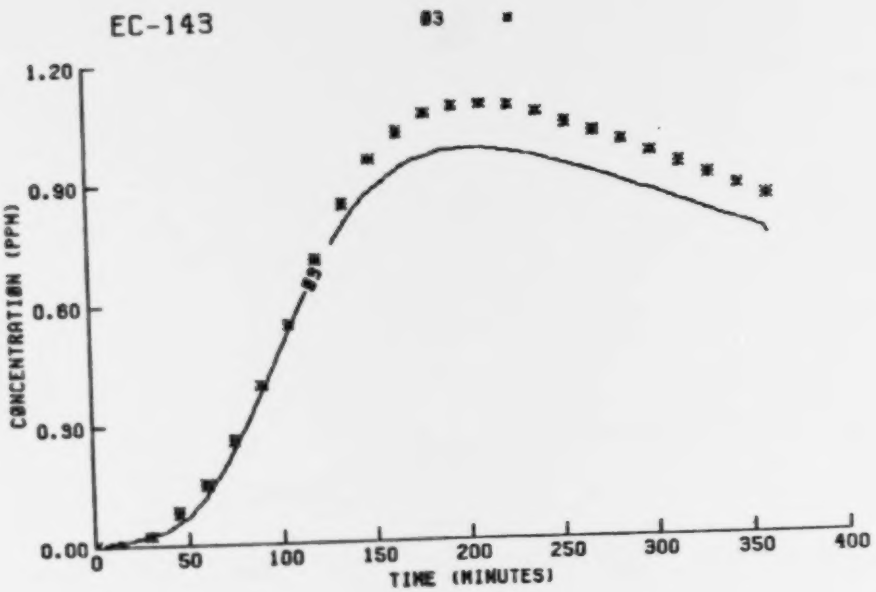
UCR ETHYLENE EXPERIMENTS

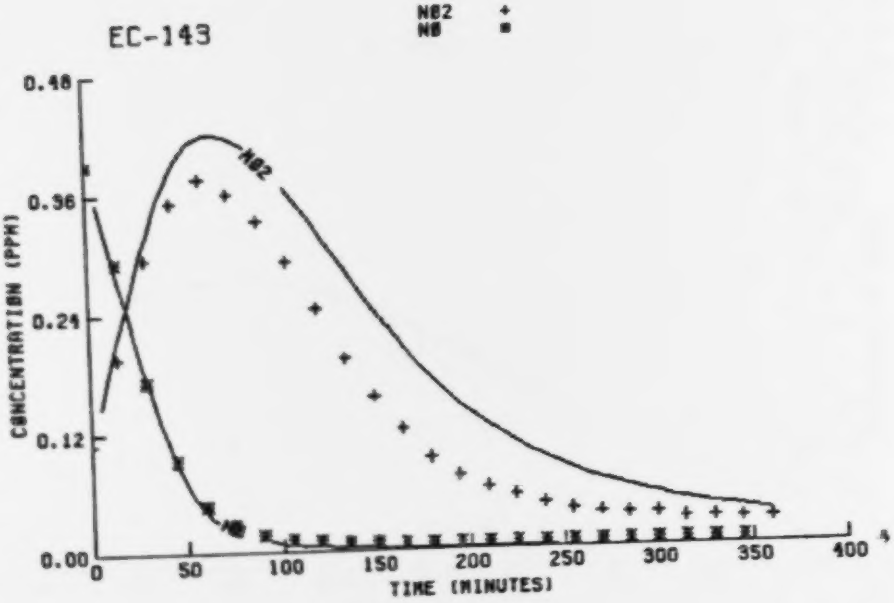

EC-142
ETH +
O3 ■
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH
O3

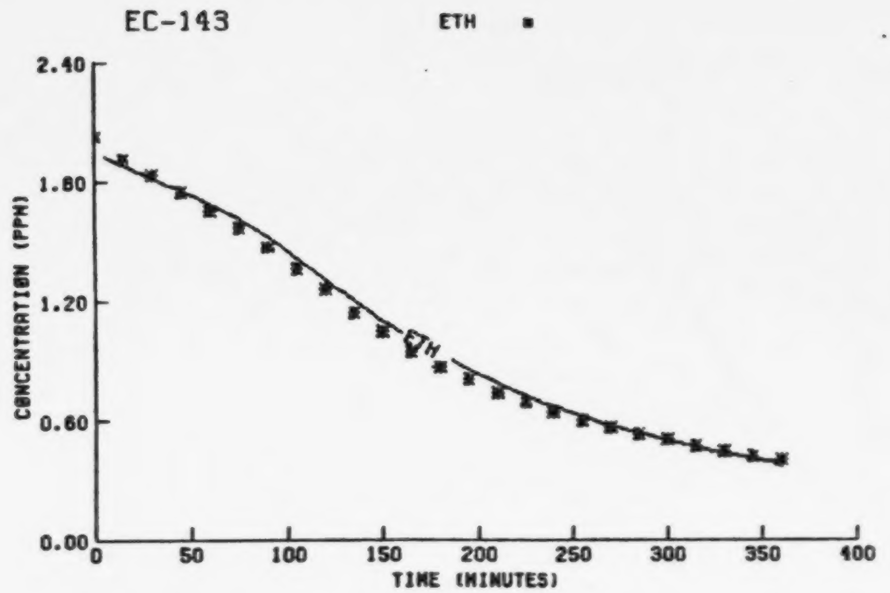

EC-142
NO2 +
NO ■
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

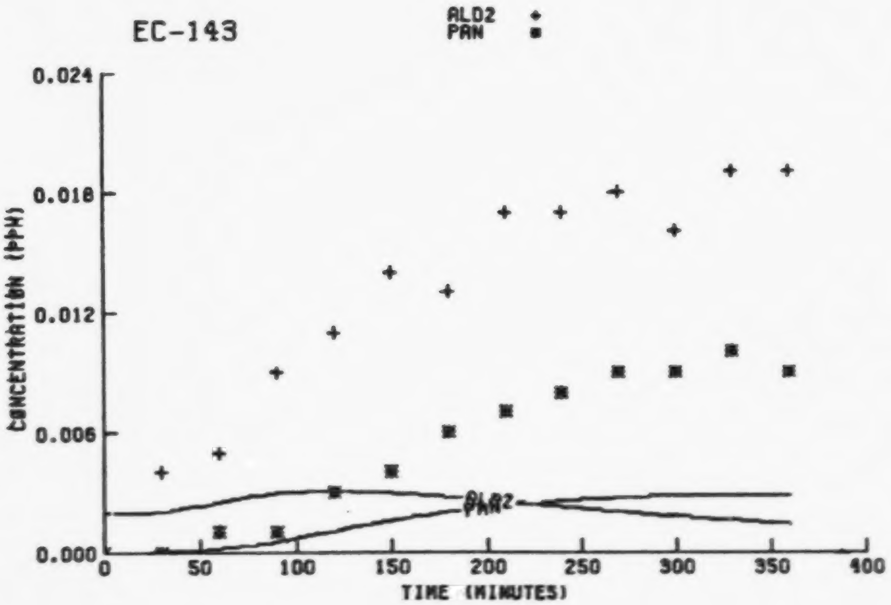

EC-142
ALD2 +
PAN ▪
0.016
0.012
0.008
0.004
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

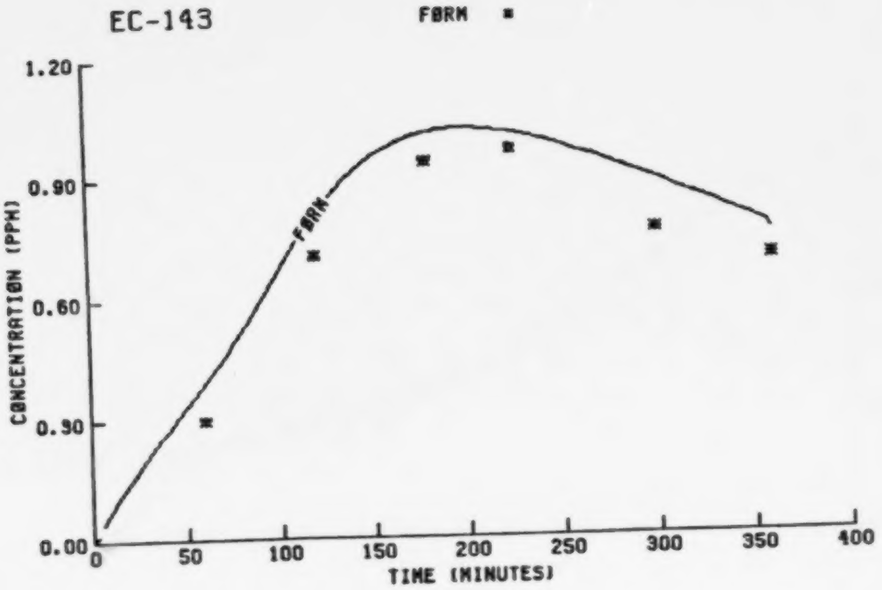

EC-142
FORM ▪
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM

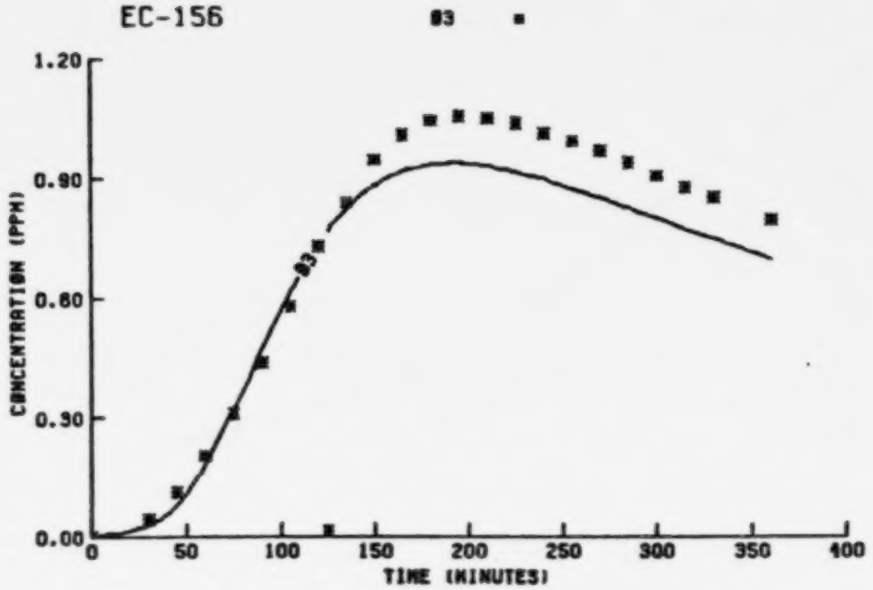

EC-143
O3
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

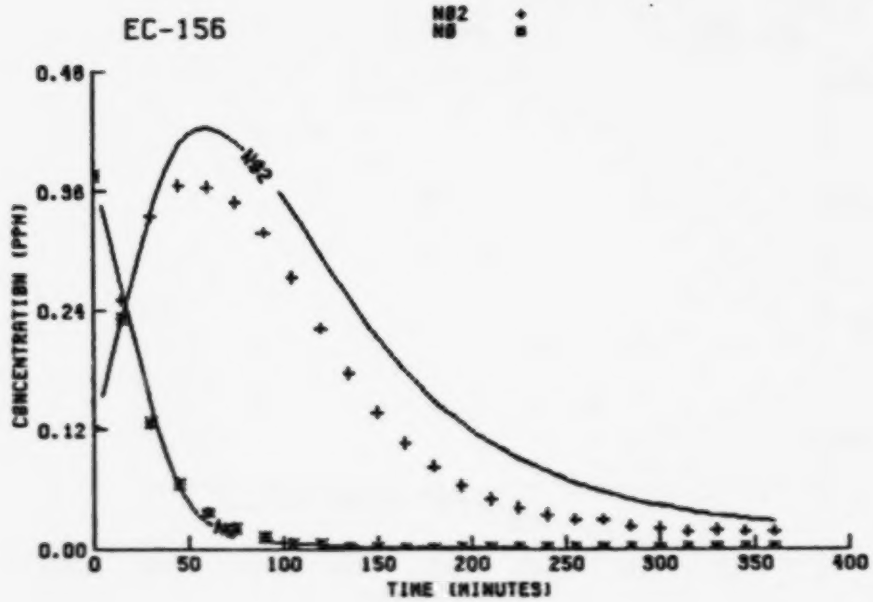

EC-143
NO2
NO
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

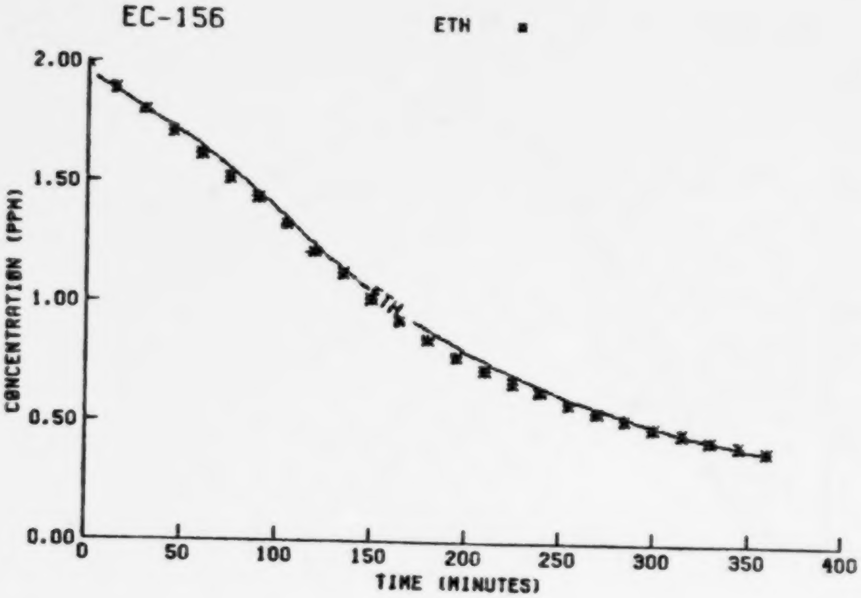

EC-143
ETH ■
2.40
1.80
1.20
0.60
0.00
CONCENTRATION (PPM)
ETH
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

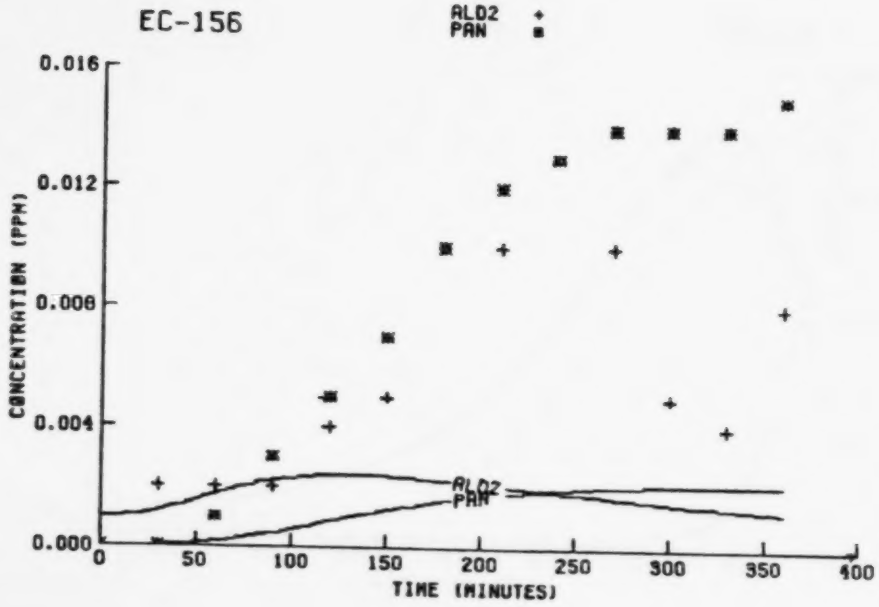

EC-143
ALD2 +
PAN ■
0.024
0.018
0.012
0.006
0.000
CONCENTRATION (PPM)
ALD2
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

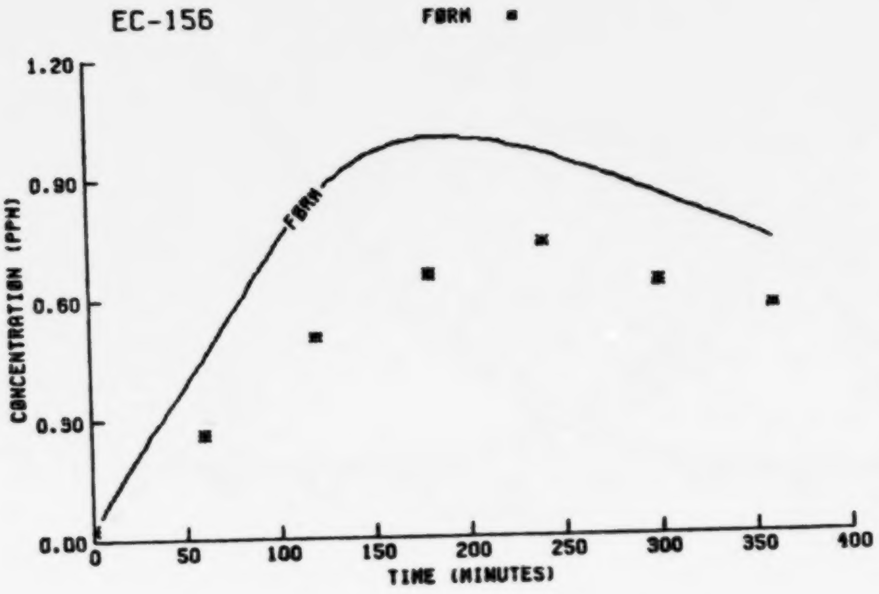

EC-143
FØRM
1.20
0.90
0.60
0.30
0.00
CØNCENTRATIØN (PPM)
FØRM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

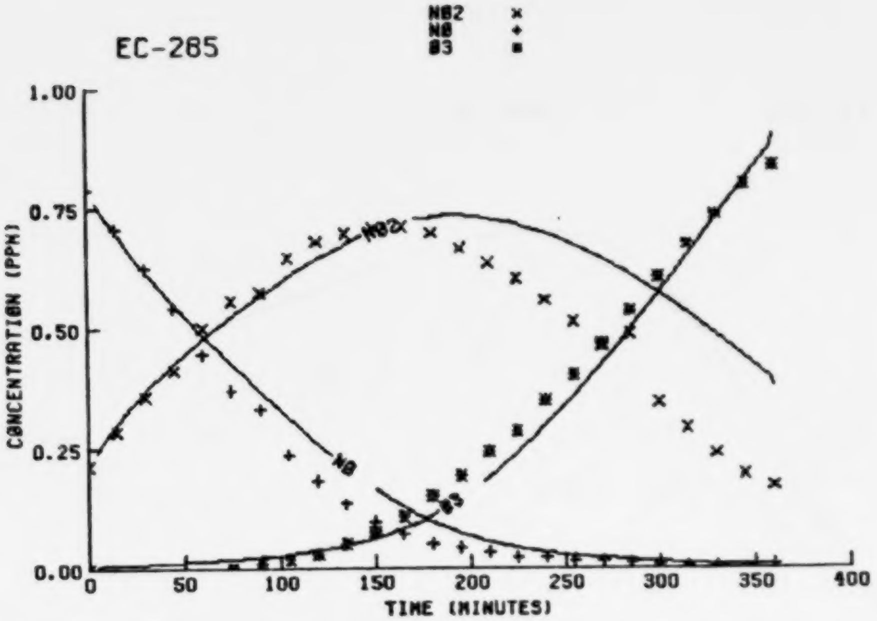

EC-156
O3
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3

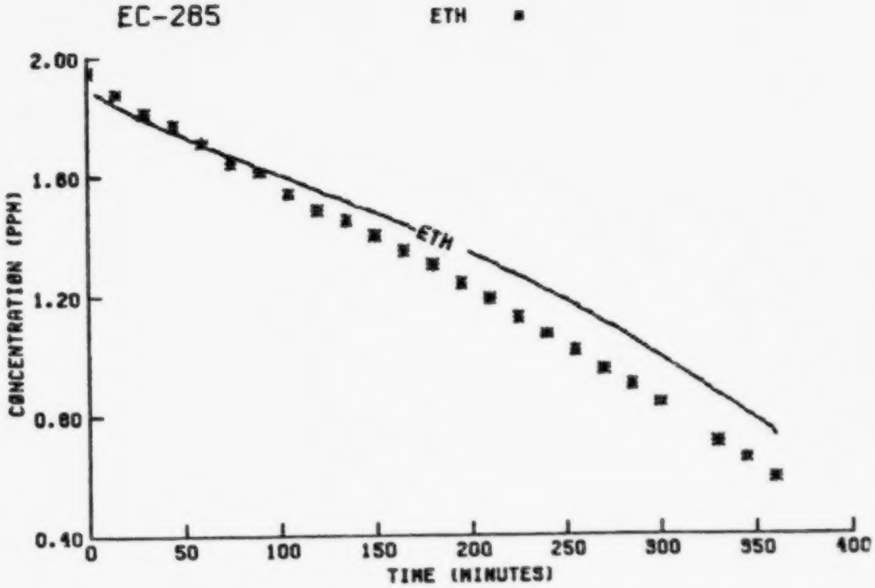

EC-156
NO2 +
NO
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

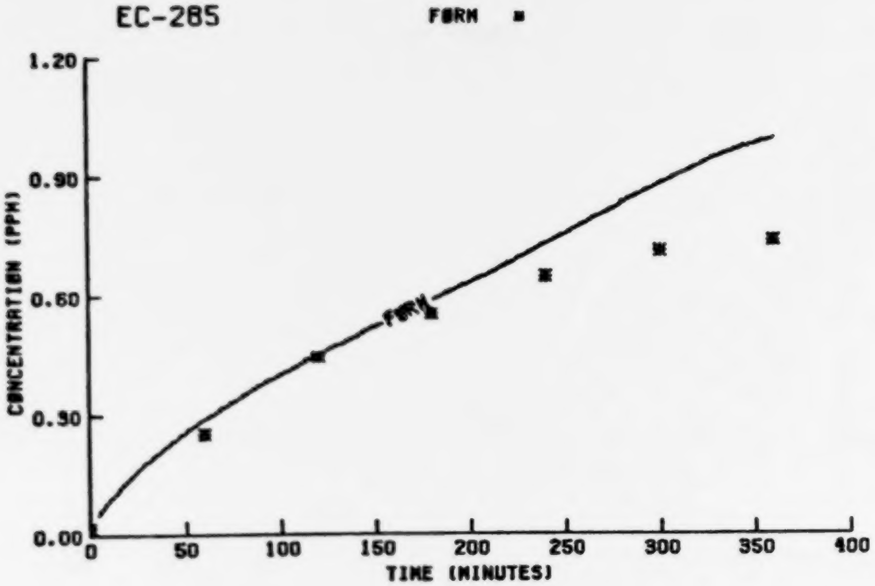

EC-156
ETH ■
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH


EC-156
ALD2 +
PAN ■
0.016
0.012
0.008
0.004
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

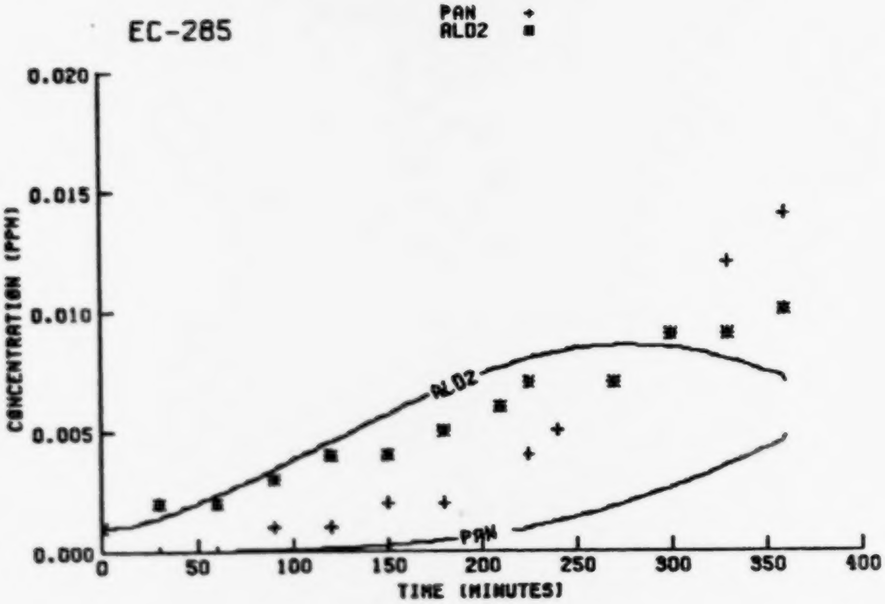

EC-156
FORM ▪
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-265
NO2 ×
NO +
O3 ■
CONCENTRATION (PPM)
1.00
0.75
0.50
0.25
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
NO2
NO
O3

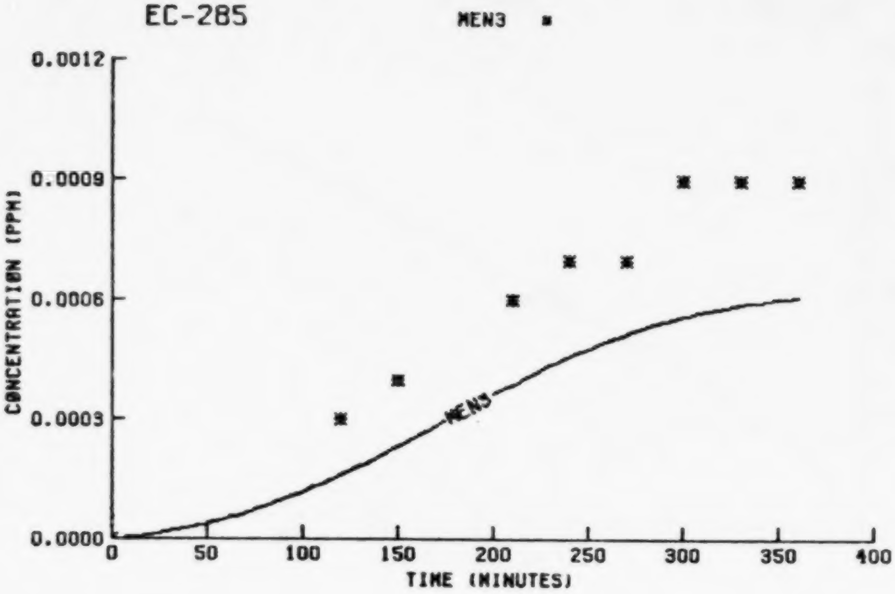

EC-265
ETH ■
CONCENTRATION (PPM)
2.00
1.60
1.20
0.80
0.40
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
ETH

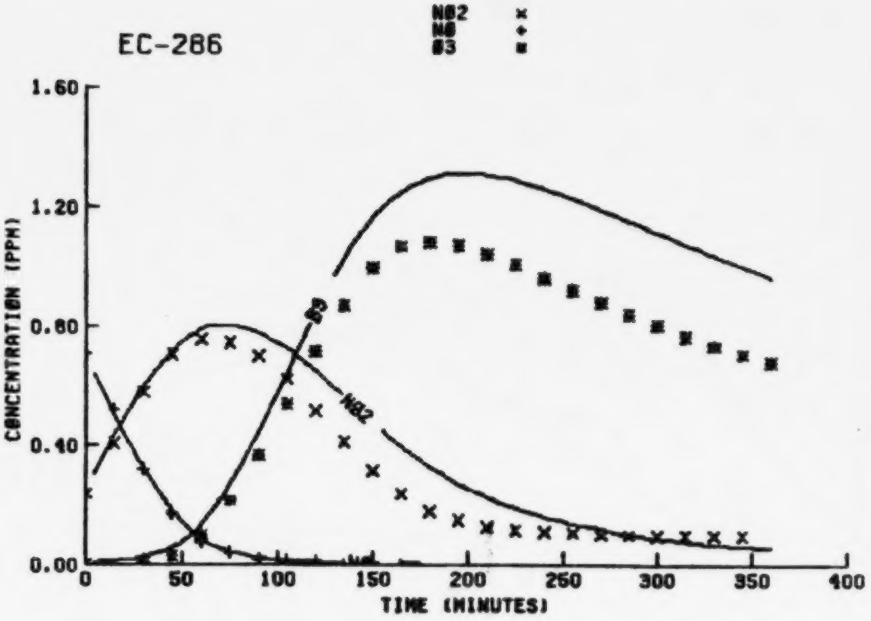


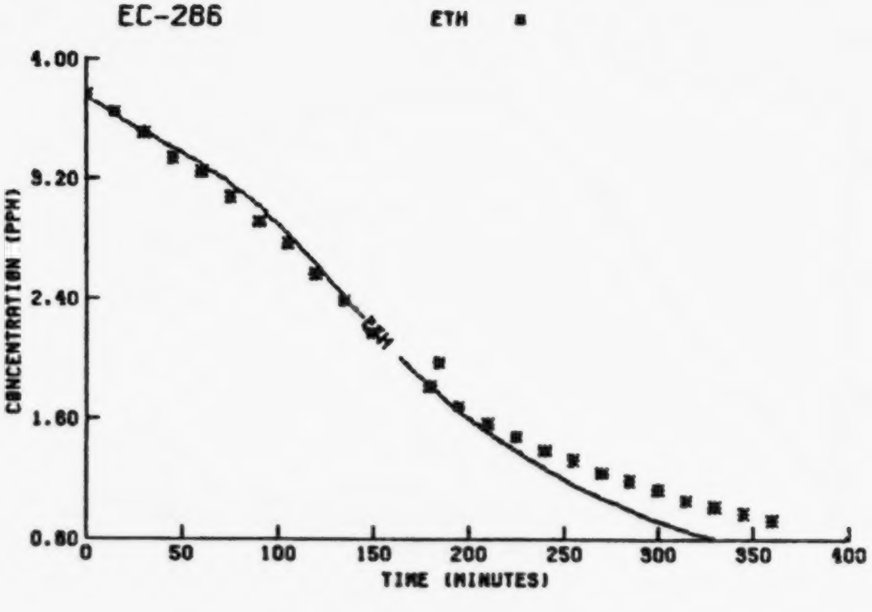
EC-285
FØRM ■
FØRM
1.20
0.90
0.60
0.30
0.00
CONCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

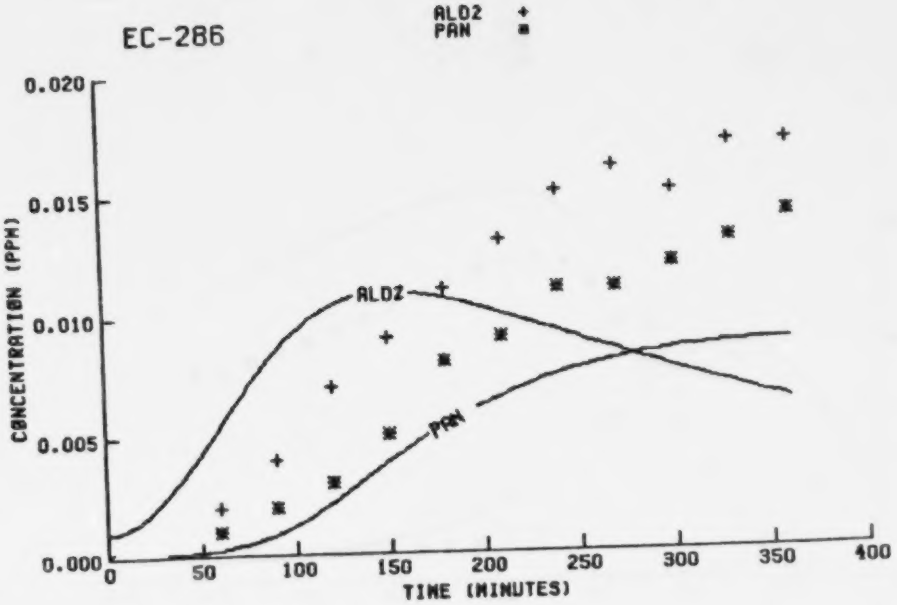


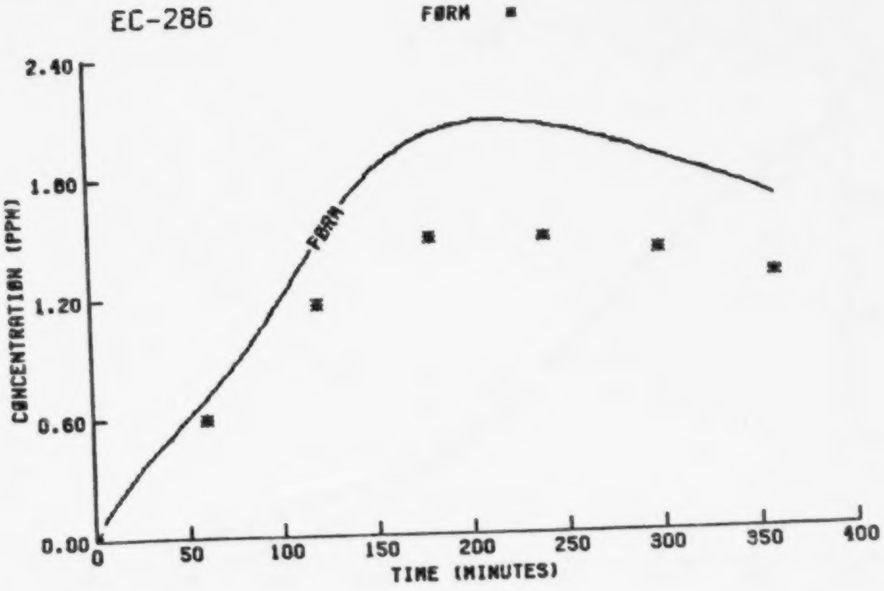
EC-285
PAN +
ALD2 ■
ALD2
PAN
0.020
0.015
0.010
0.005
0.000
CONCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

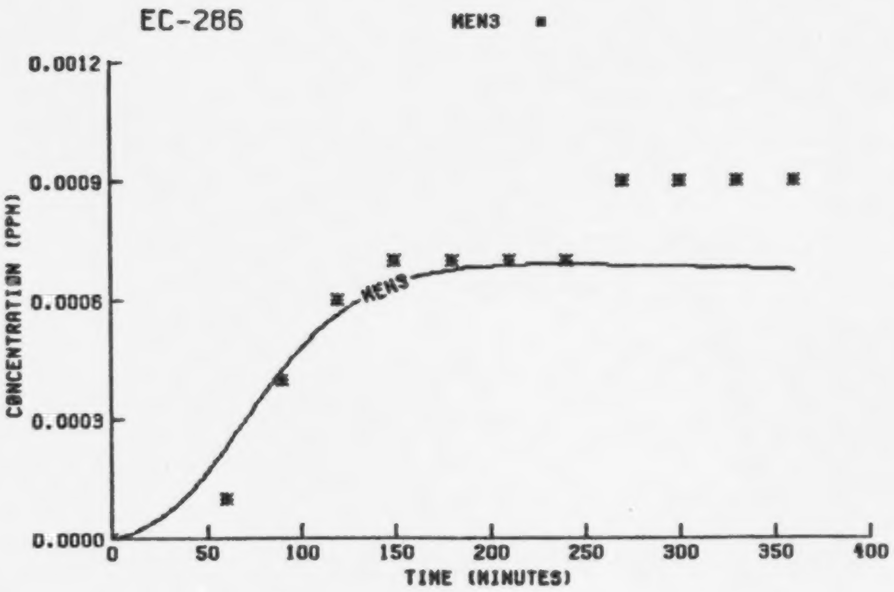

EC-285
MEN3 *
0.0012
0.0009
0.0006
0.0003
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3

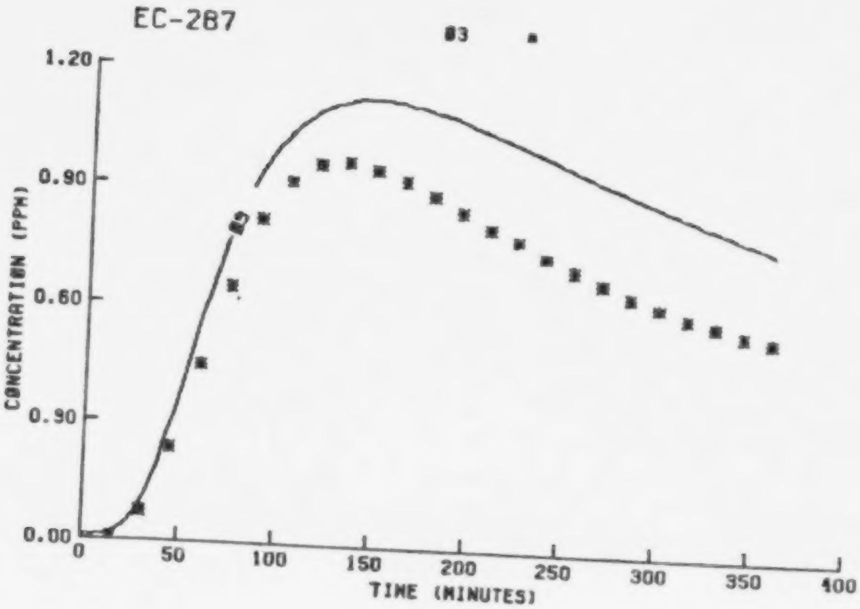

EC-286
NØ2 ×
NØ +
Ø3 *
CØNCENTRATIØN (PPM)
1.60
1.20
0.80
0.40
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
Ø3
NØ2

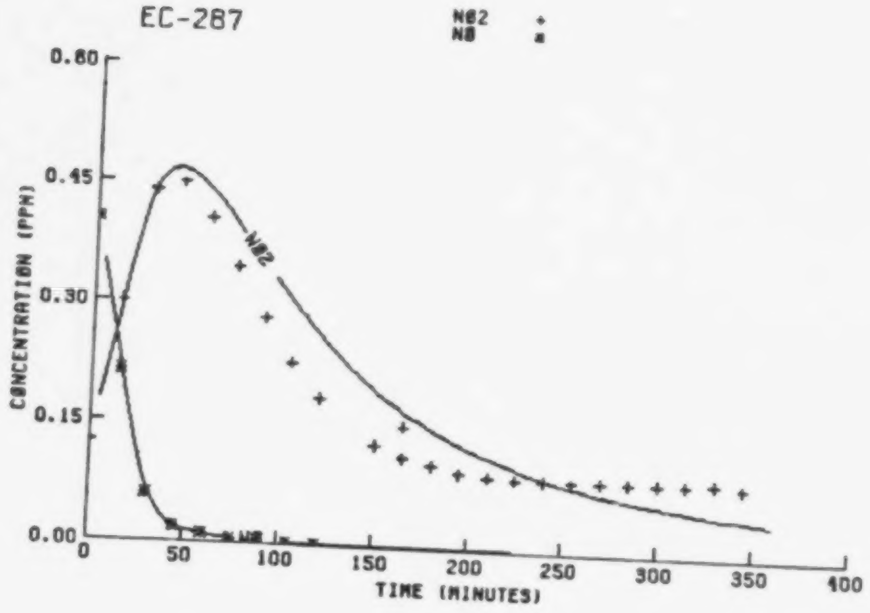

EC-286
ETH *
CØNCENTRATIØN (PPM)
4.00
3.20
2.40
1.60
0.80
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

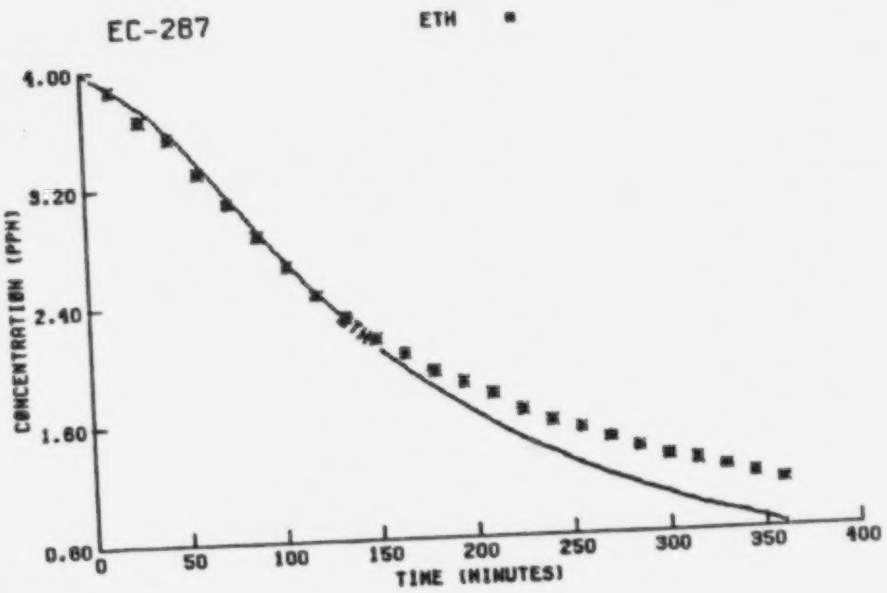

EC-286
ALD2 +
PAN ✱
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

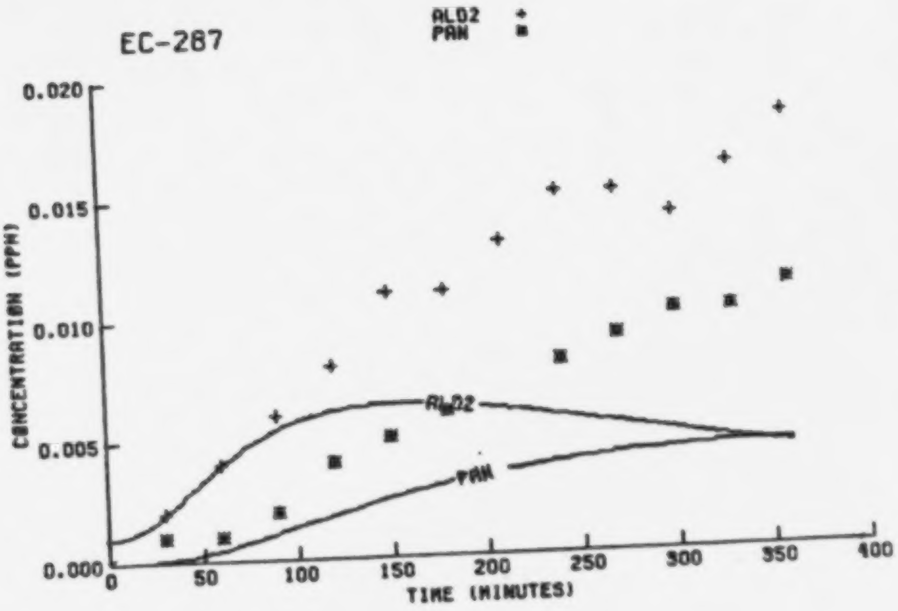

EC-286
FORM ✱
2.40
1.80
1.20
0.60
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM

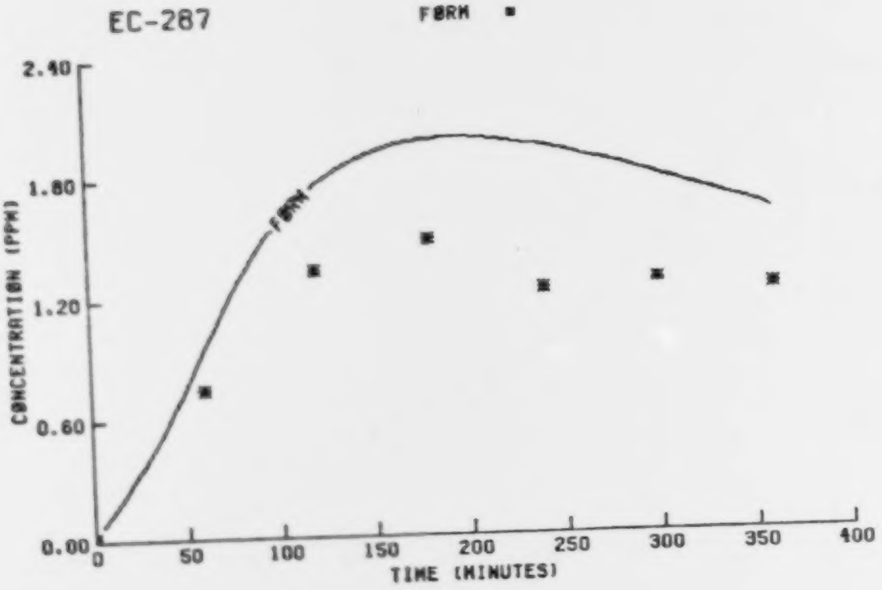

EC-286
MEN3 ■
0.0012
0.0009
0.0006
0.0003
0.0000
CONCENTRATION (PPM)
MEN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-287
O3 ✱
1.20
0.90
0.60
0.90
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

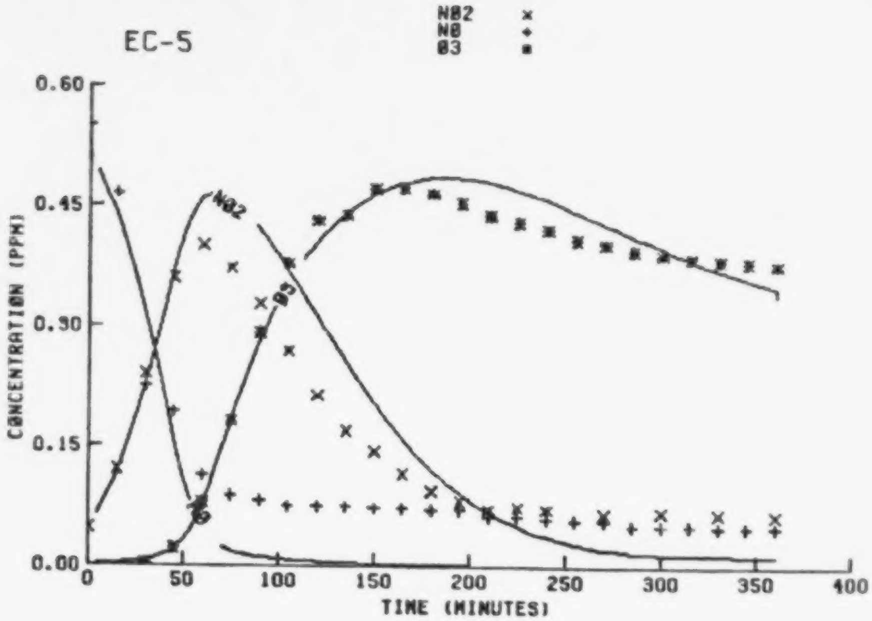

EC-287
NO2 +
NO ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

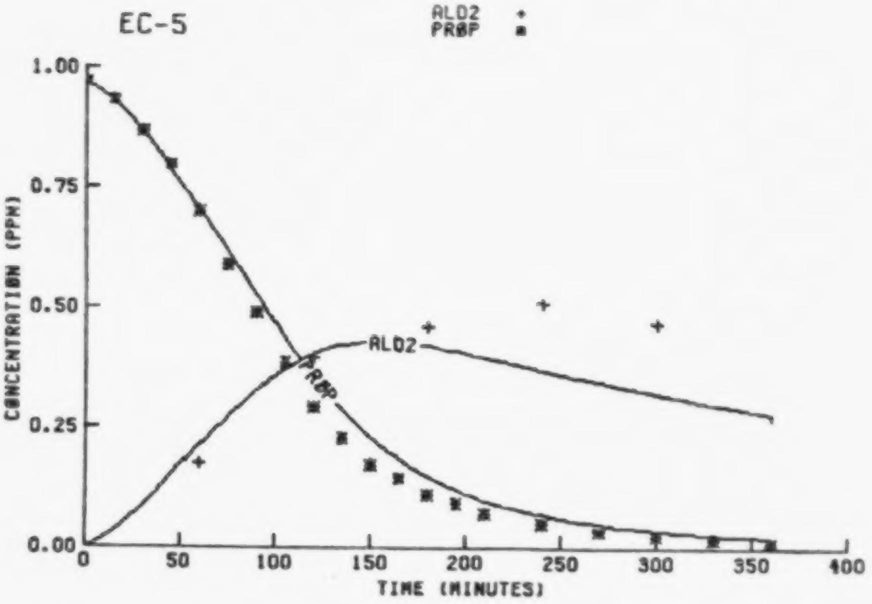

EC-287
ETH ■
4.00
3.20
2.40
1.60
0.80
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

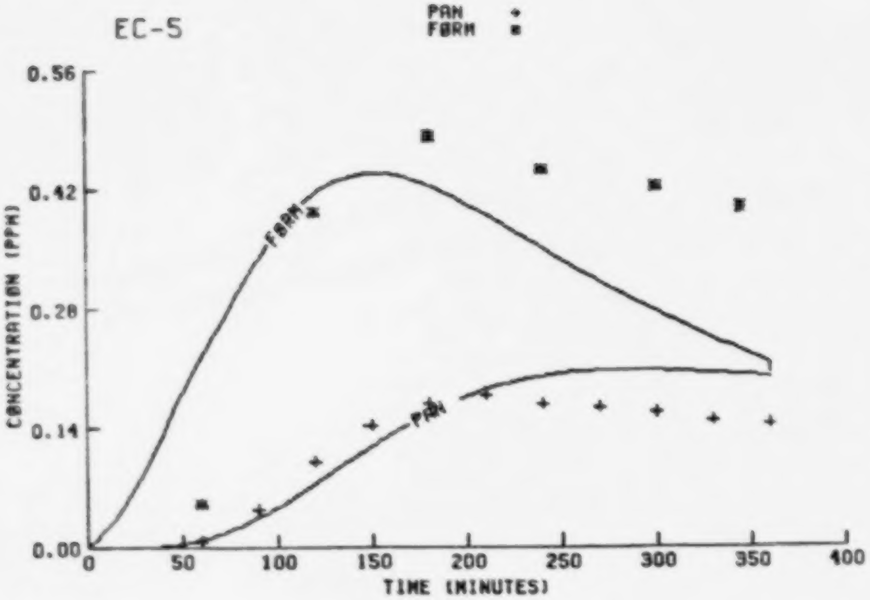

EC-287
ALD2 +
PAN ■
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

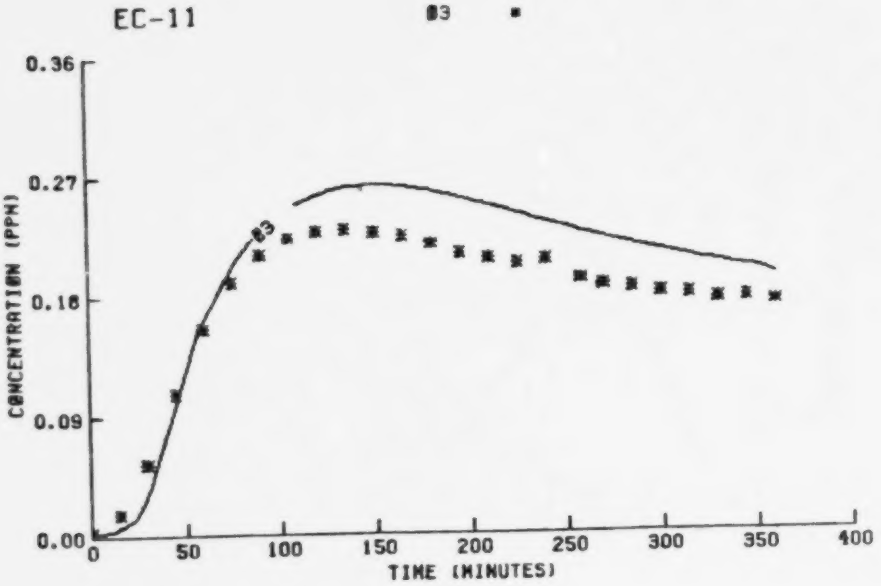

EC-287
FORM ■
2.40
1.80
1.20
0.60
0.00
CONCENTRATION (PPM)
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

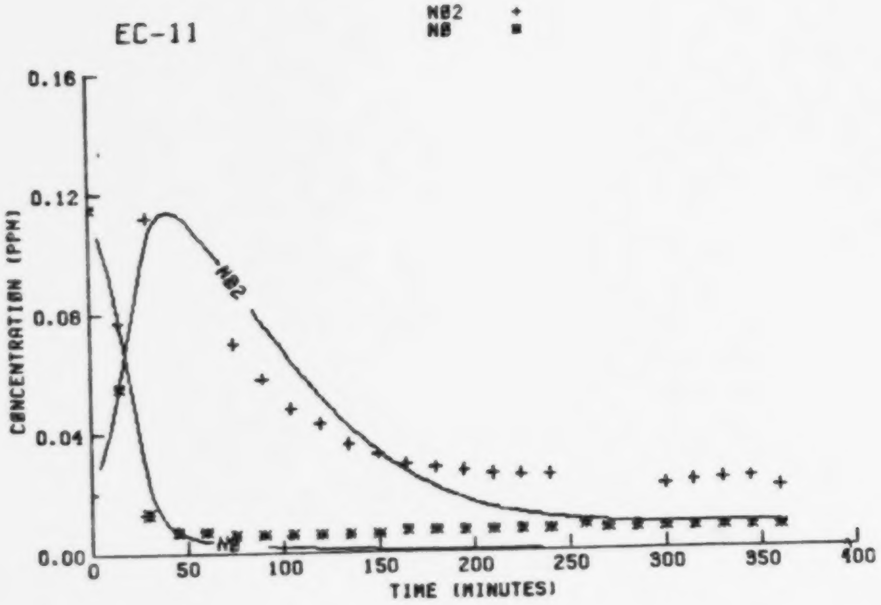
UCR PROPYLENE EXPERIMENTS

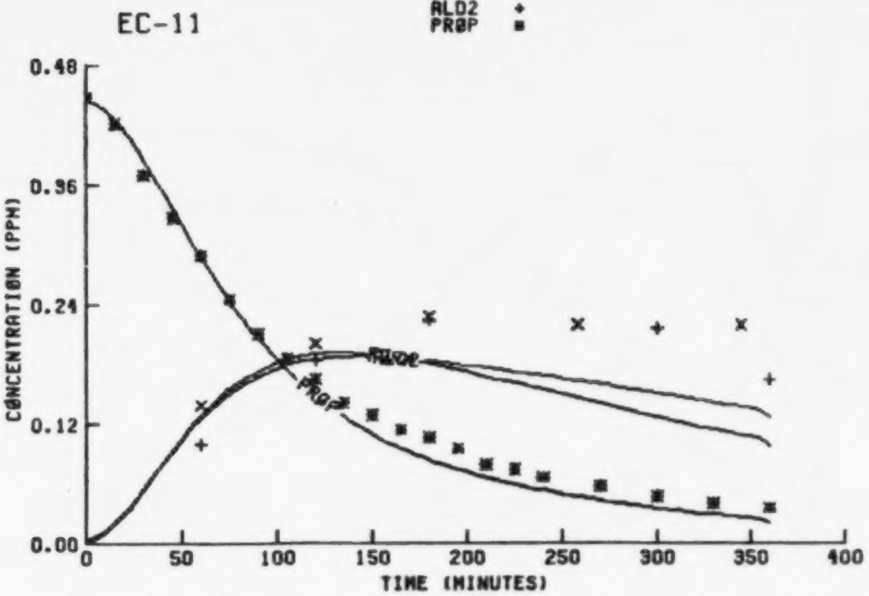

EC-5
NO2 ×
NO +
O3 ■
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
O3
NO

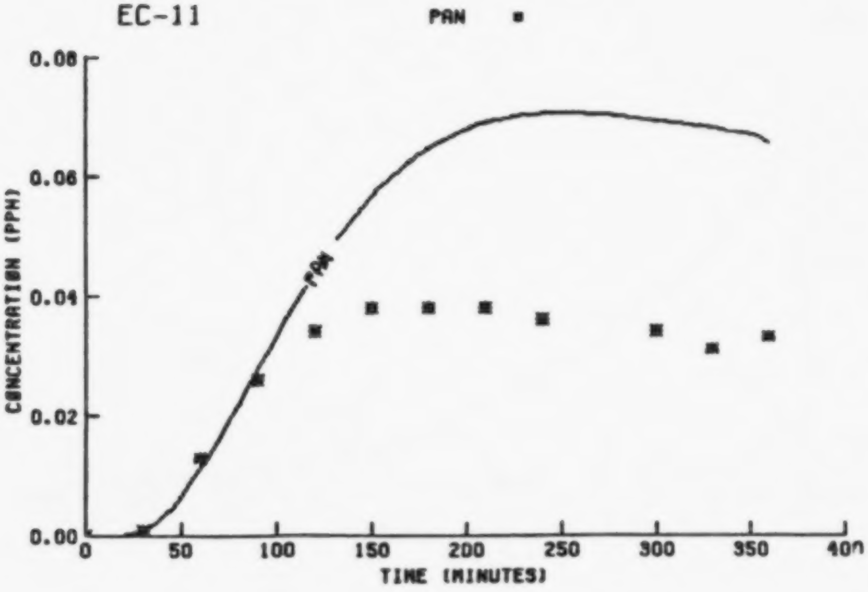

EC-5
ALD2 +
PROP ■
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PROP

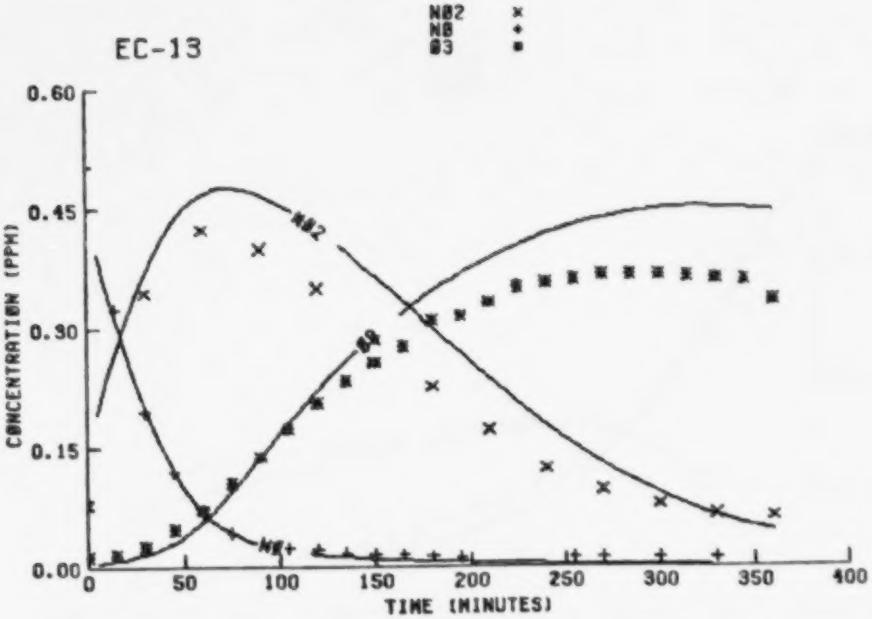

EC-5
PAN +
FØRM ×
0.56
0.42
0.28
0.14
0.00
CØNCENTRATIØN (PPM)
FØRM
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

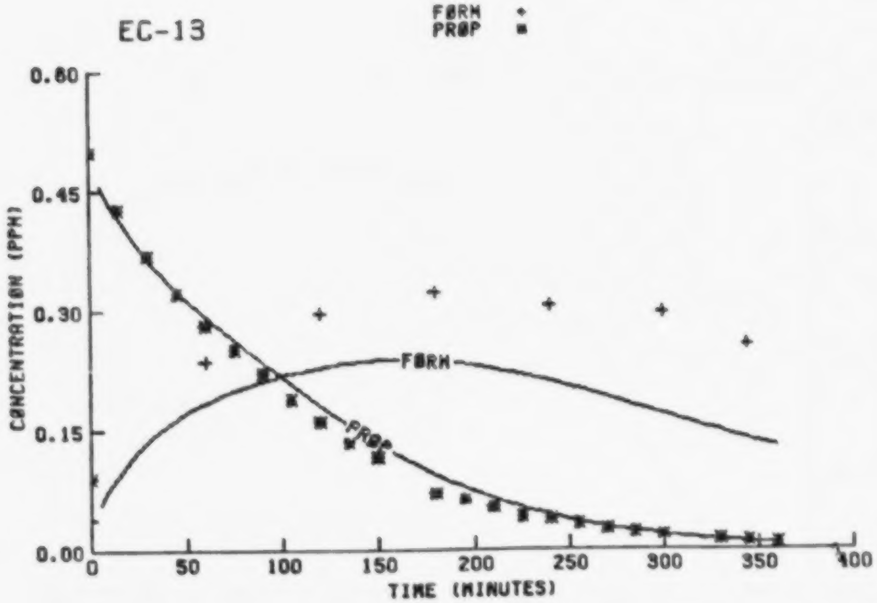

EC-11
O3 ✱
0.36
0.27
0.18
0.09
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

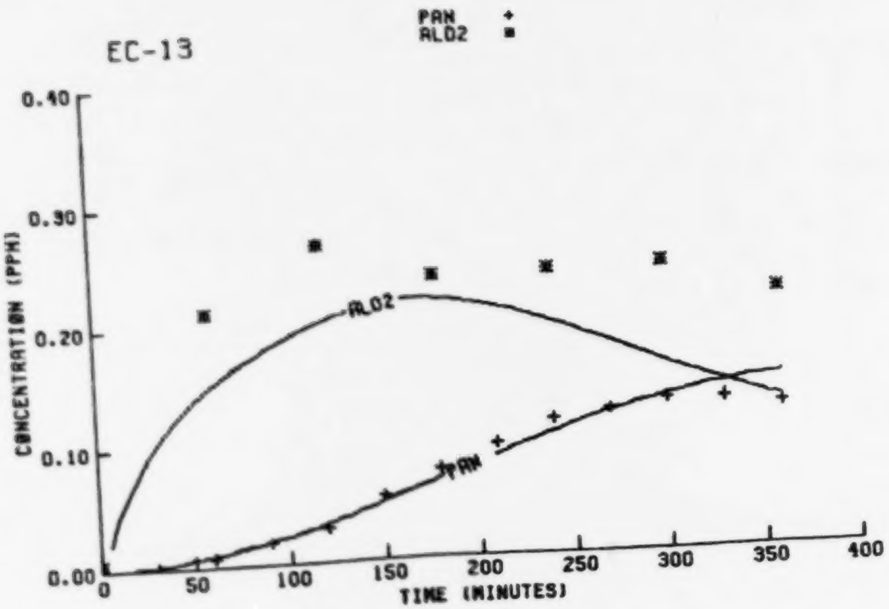

EC-11
NO2 +
NO ✱
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

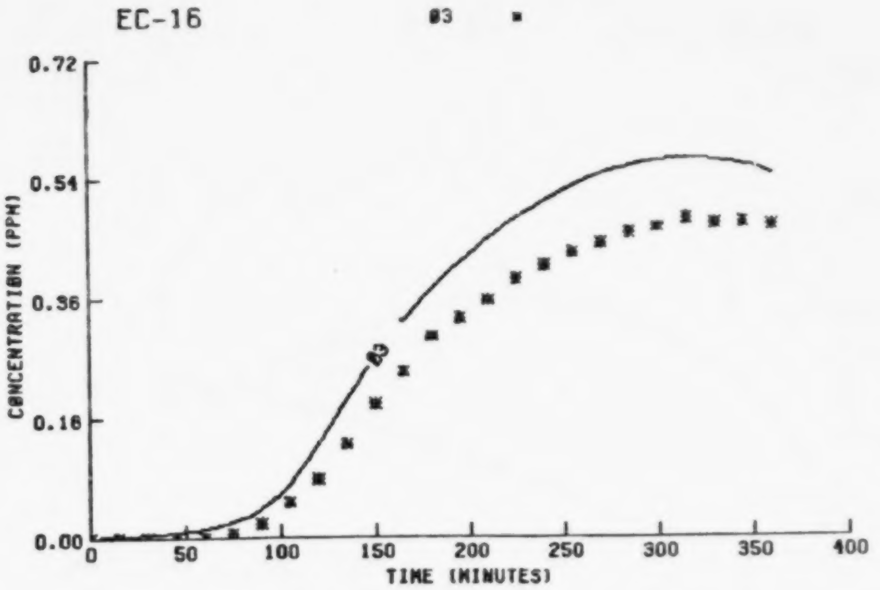

FØRM ×
ALD2 +
PRØP ▪
EC-11
CØNCENTRATIØN (PPM)
0.48
0.36
0.24
0.12
0.00
ALD2
PRØP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

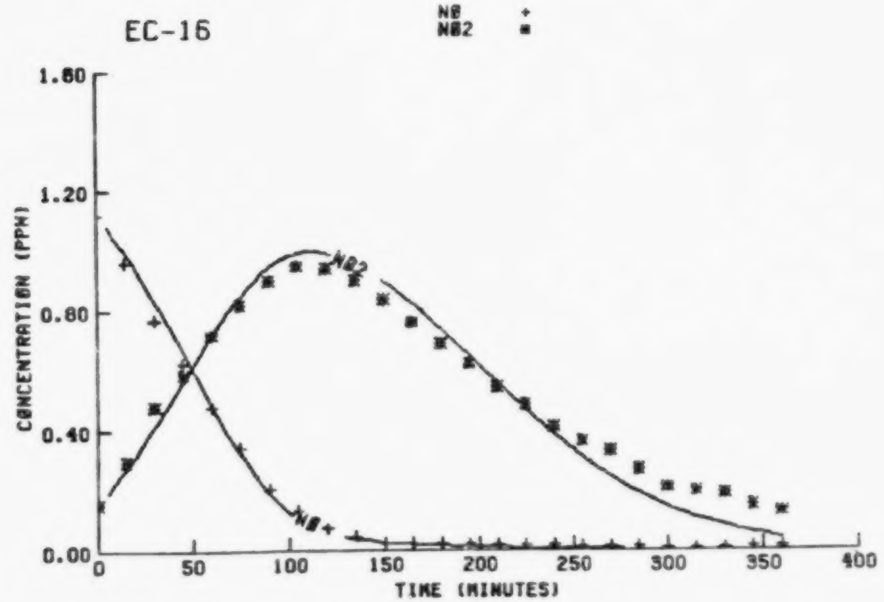

EC-11
PAN ▪
CØNCENTRATIØN (PPM)
0.08
0.06
0.04
0.02
0.00
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

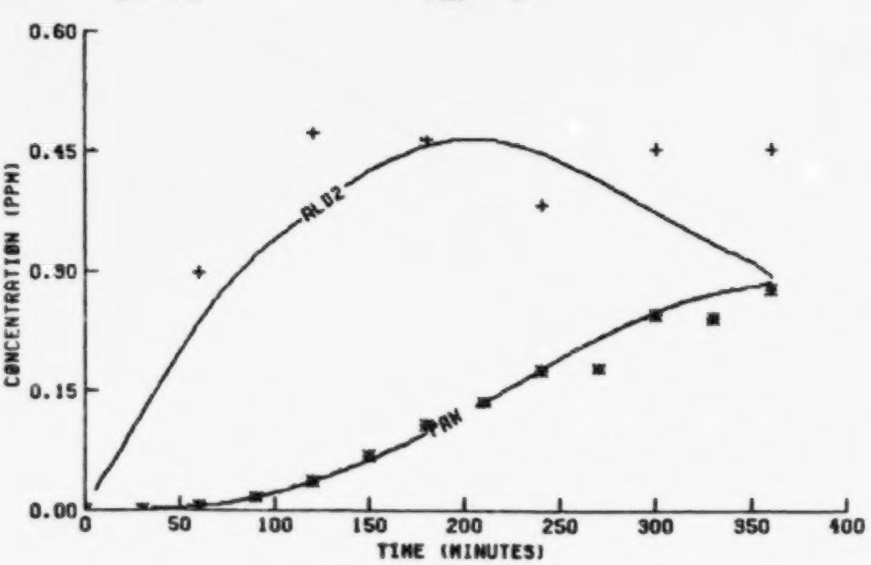

EC-13
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.60
0.45
0.30
0.15
0.00
NO2
O3
NO
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

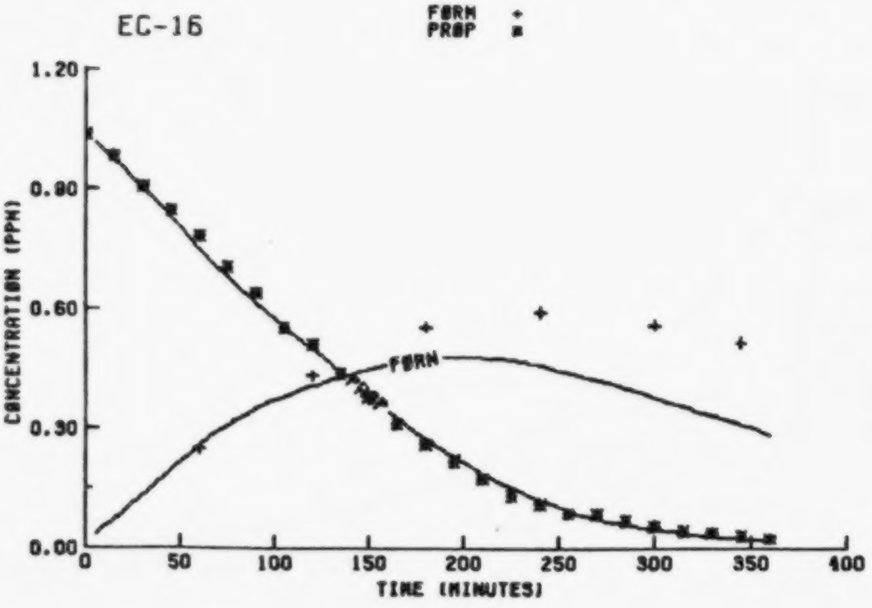

EC-13
FORM +
PROP ✱
CONCENTRATION (PPM)
0.60
0.45
0.30
0.15
0.00
FORM
PROP
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

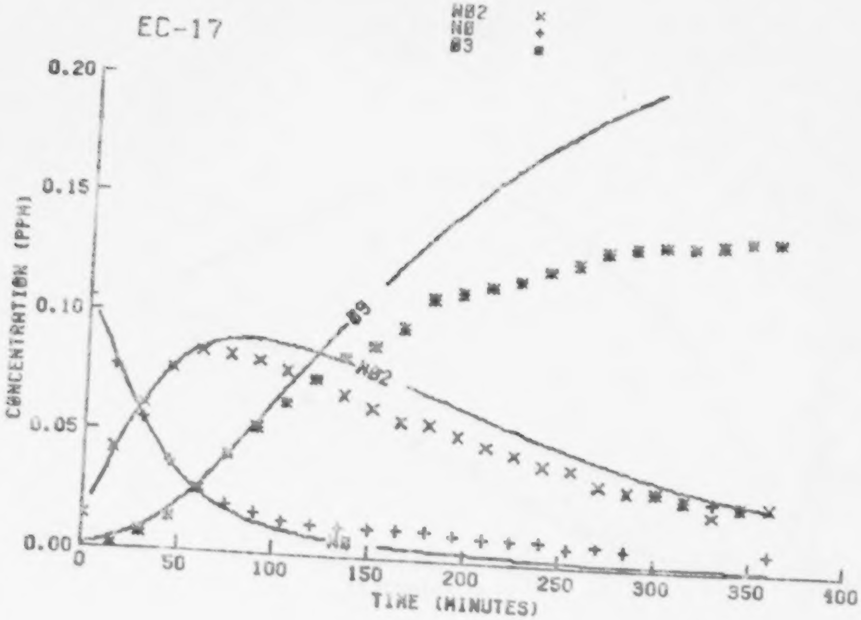

EC-13
PAN +
ALD2 ✱
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN


EC-16
O3 ✱
0.72
0.54
0.36
0.18
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

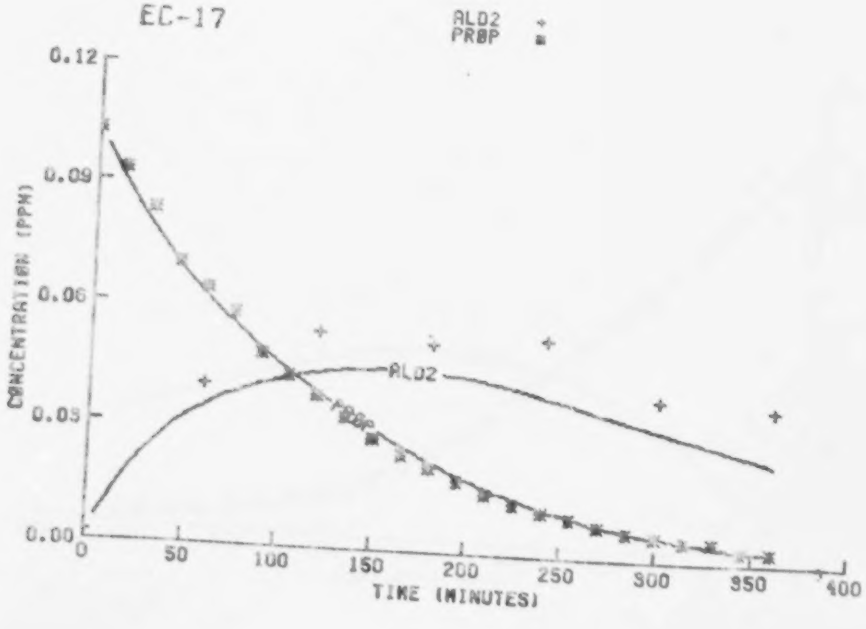

EC-16
NO +
NO2 ✱
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-16
ALD2 +
PAN ■
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
ALD2
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

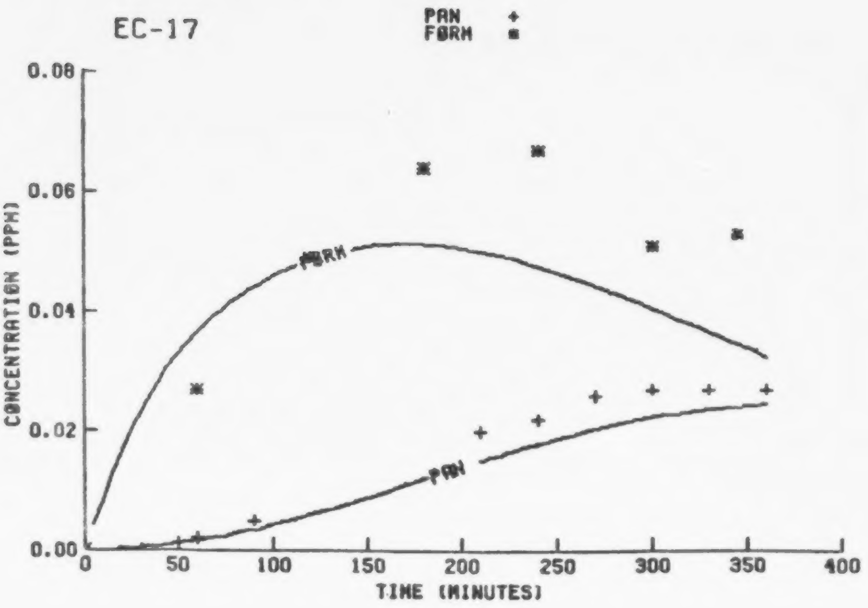

EC-16
FORM +
PROP ■
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
FORM
PROP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

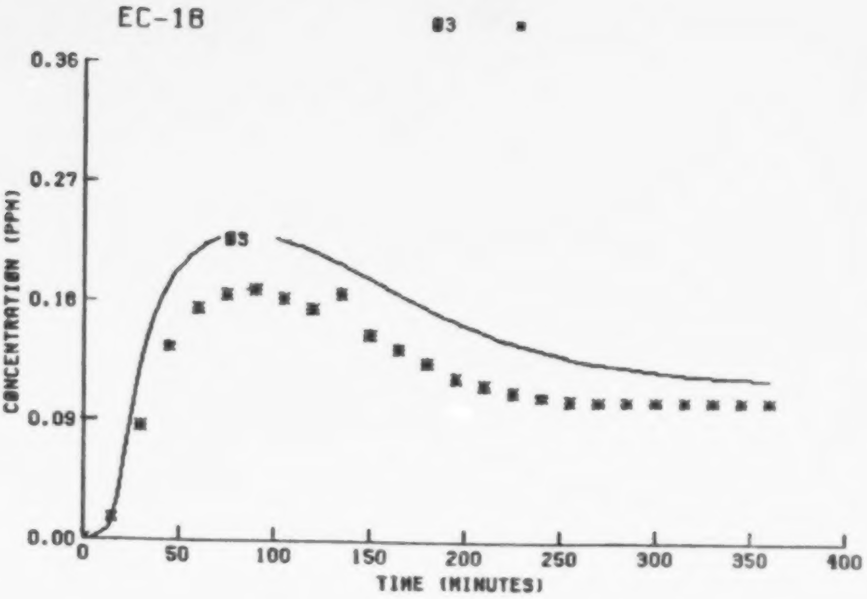

EC-17

NO2 ×
NO +
O3 *
CONCENTRATION (PPM)
0.20
0.15
0.10
0.05
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
O3
NO2
NO

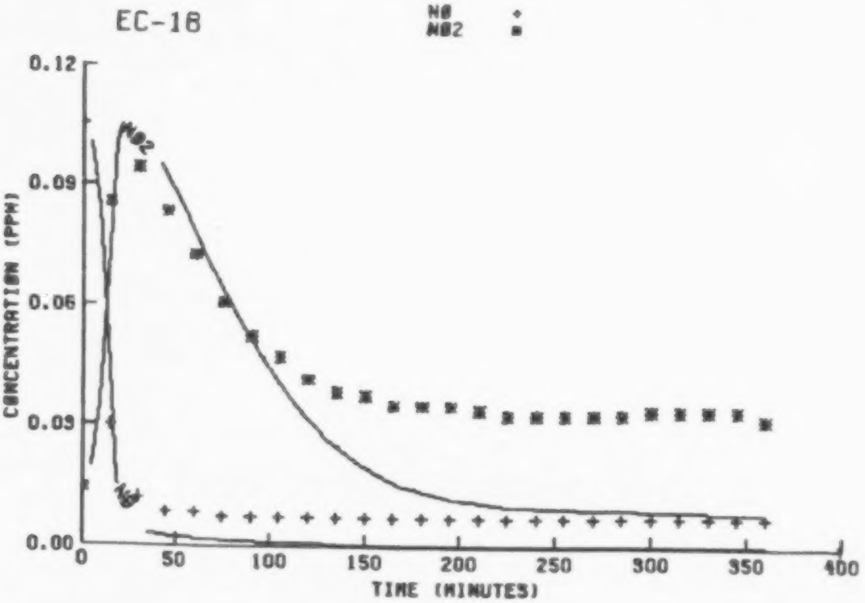

EC-17

ALD2 +
PROP *
CONCENTRATION (PPM)
0.12
0.09
0.06
0.03
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
ALD2
PROP

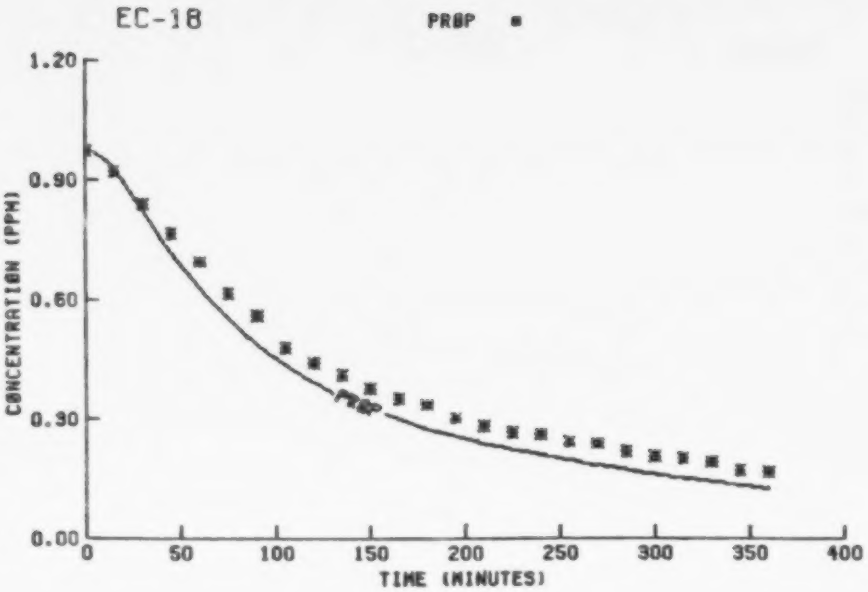

EC-17
PAN +
FØRM *
0.08
0.06
0.04
0.02
0.00
CONCENTRATIØN (PPM)
FØRM
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

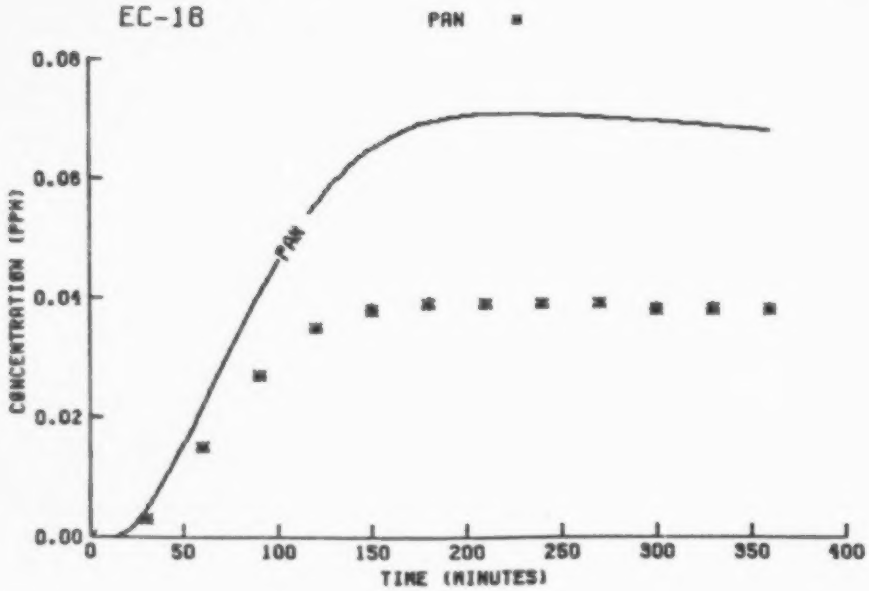


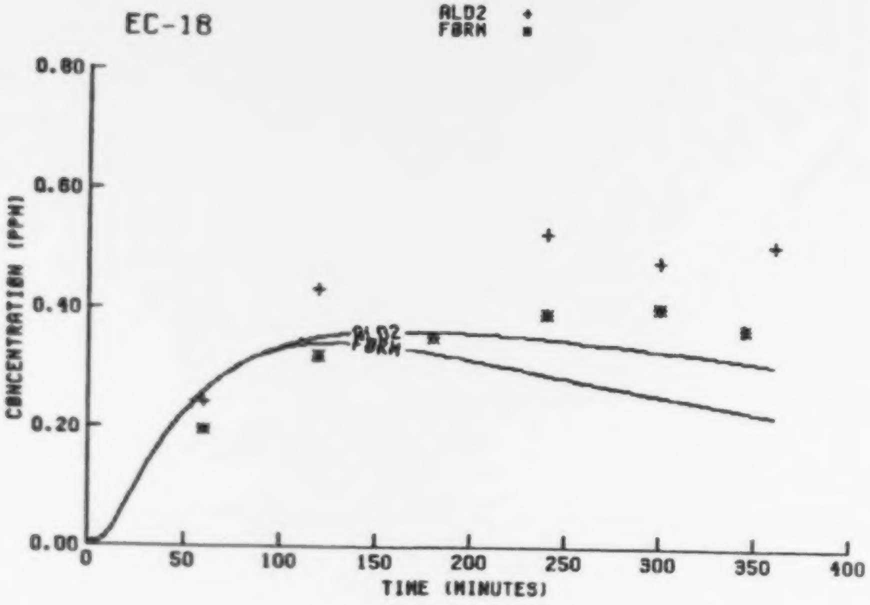
EC-18
O3 *
0.36
0.27
0.18
0.09
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

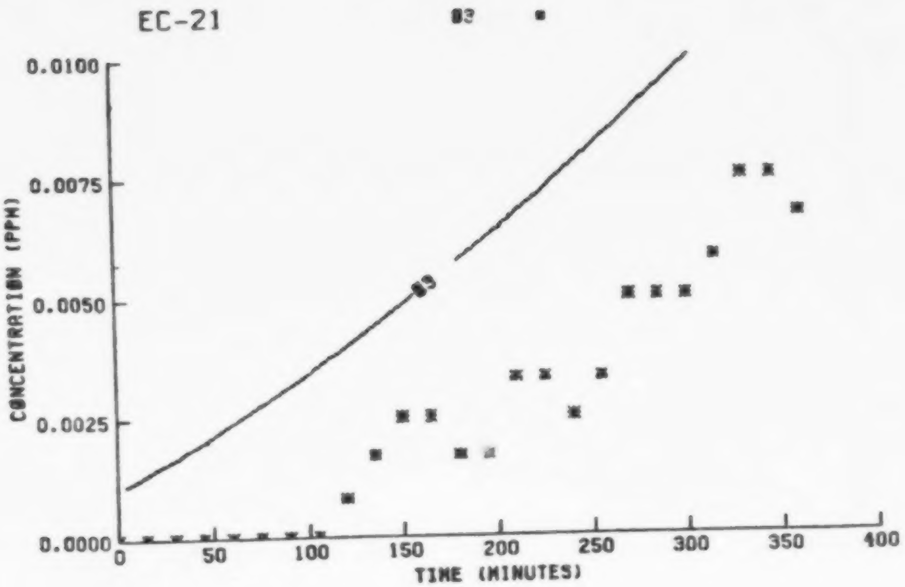


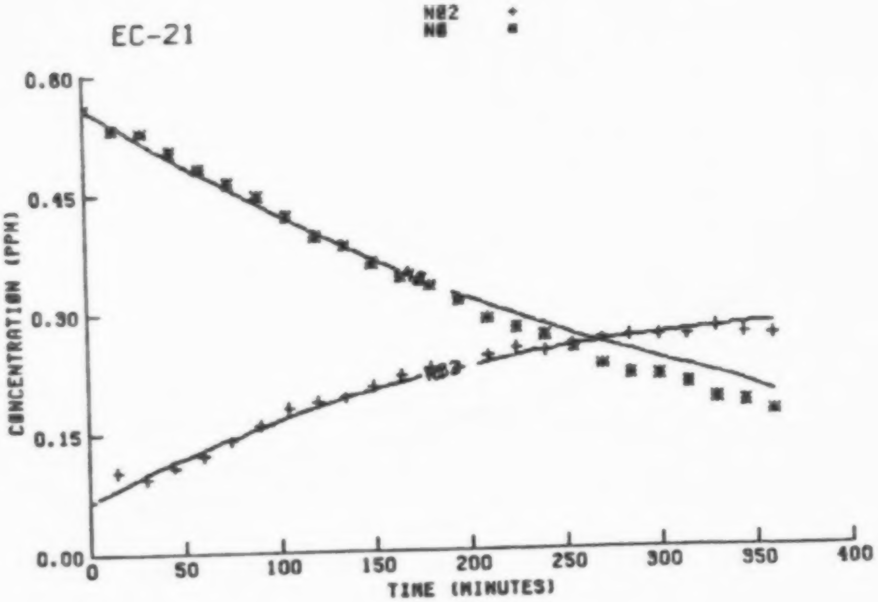
EC-18
NO +
NO2 *
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

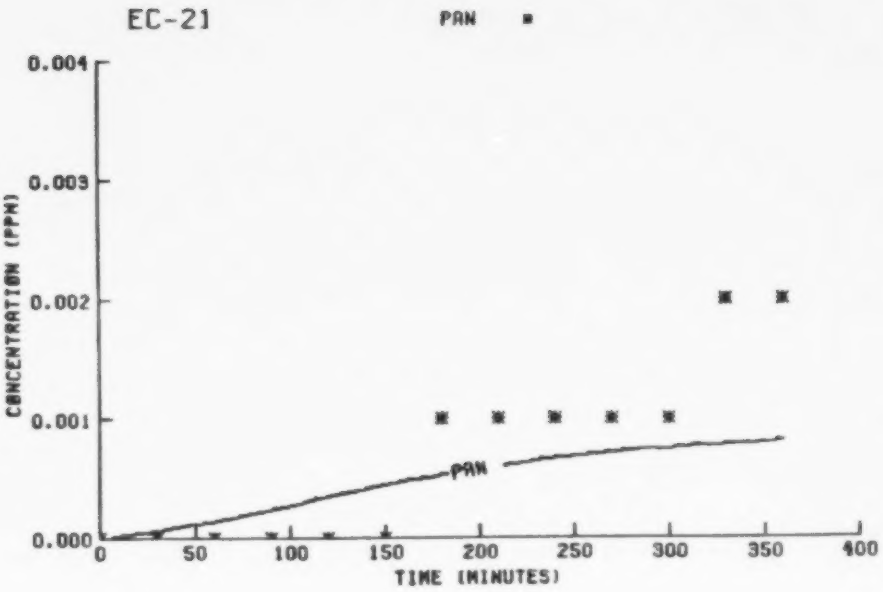

EC-18
PROP ■
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
PROP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

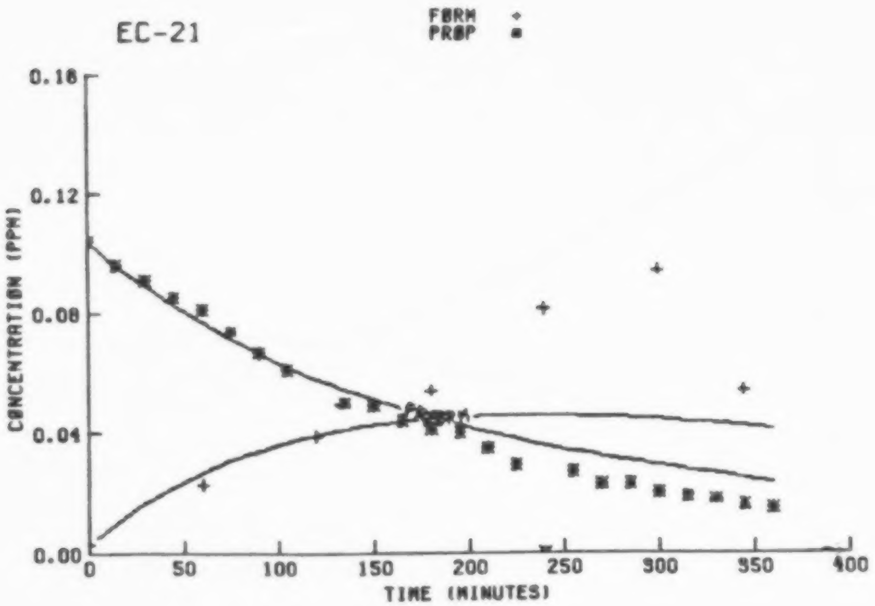

EC-18
PAN ■
0.08
0.06
0.04
0.02
0.00
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

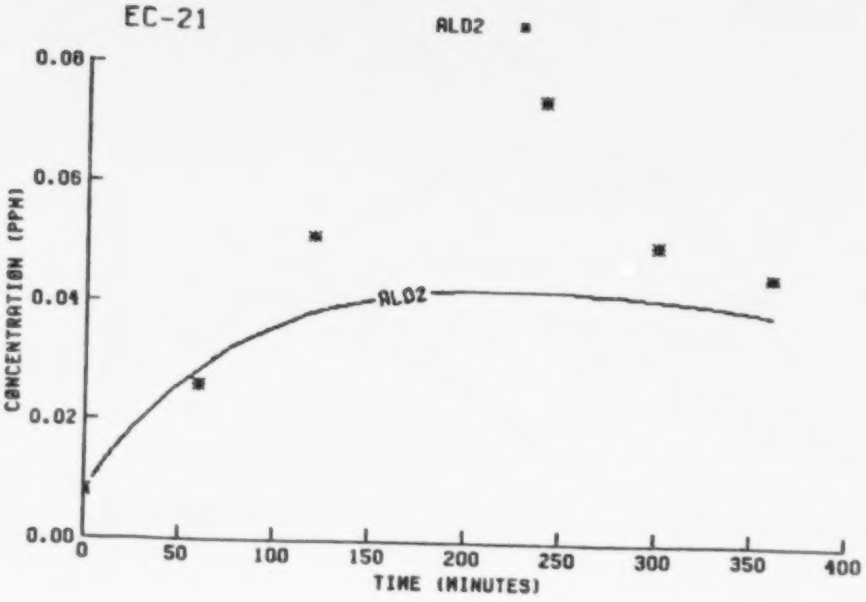

EC-18
ALD2 +
FORM ■
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
ALD2
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

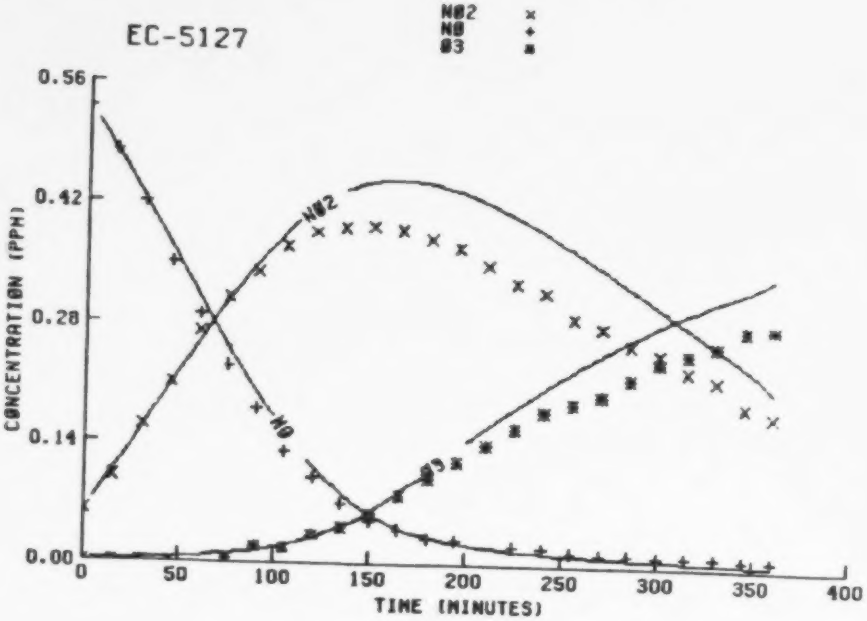

EC-21
O3
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

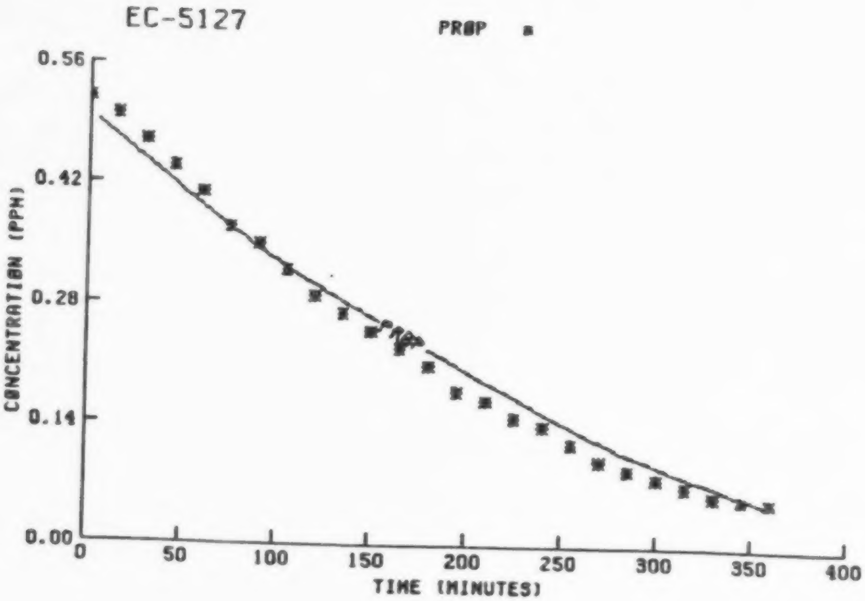

EC-21
NO2 +
NO *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
NO
NO2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

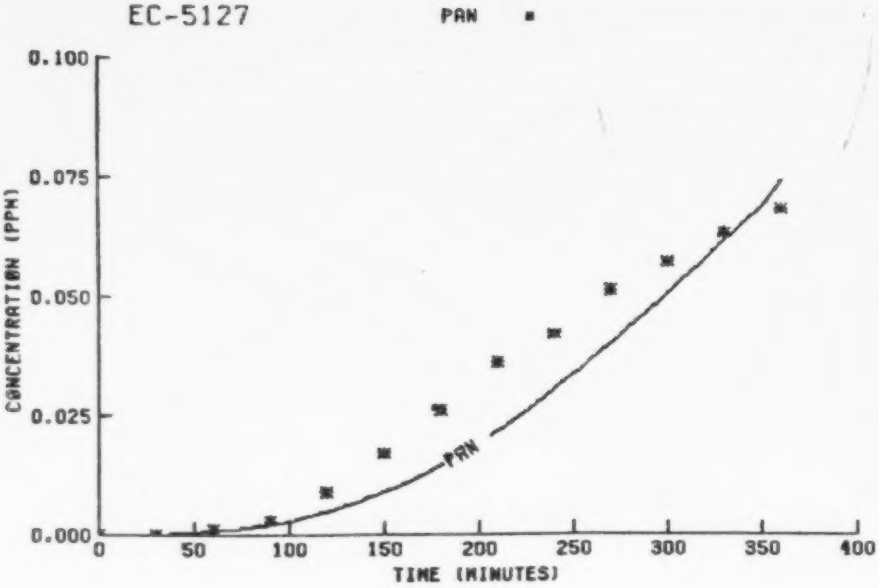

EC-21
PAN
CONCENTRATION (PPM)
0.000
0.001
0.002
0.003
0.004
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
PAN

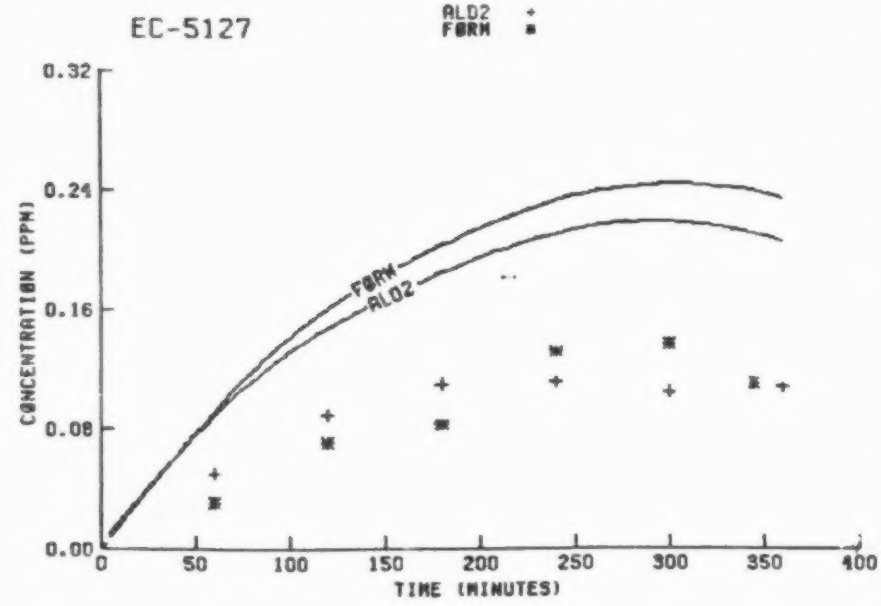

EC-21
FORM +
PROP
CONCENTRATION (PPM)
0.00
0.04
0.08
0.12
0.16
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

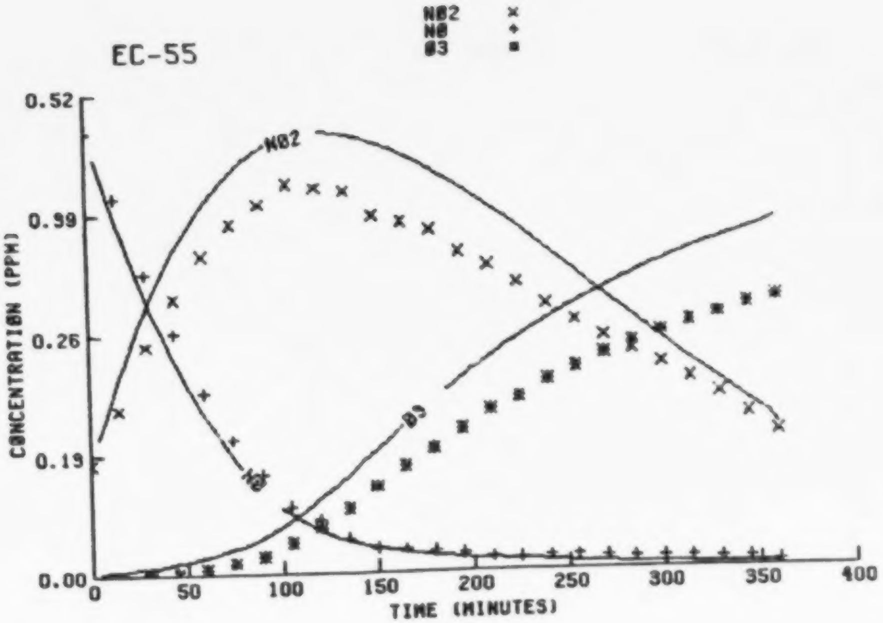

EC-21
ALD2 *
0.08
0.06
0.04
0.02
0.00
CONCENTRATION (PPM)
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

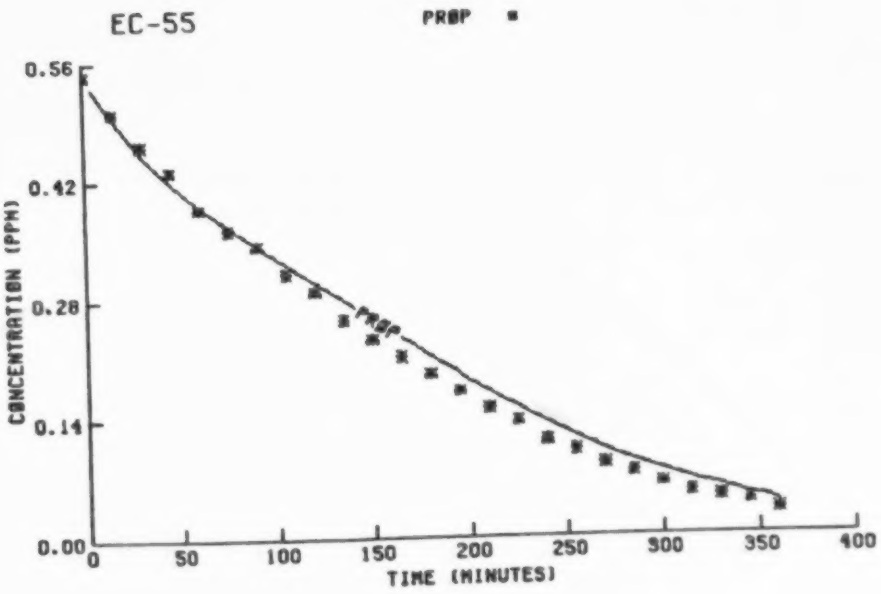

EC-5127
NØ2 ×
NØ +
Ø3 ✱
0.56
0.42
0.28
0.14
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NØ2
NØ
Ø3

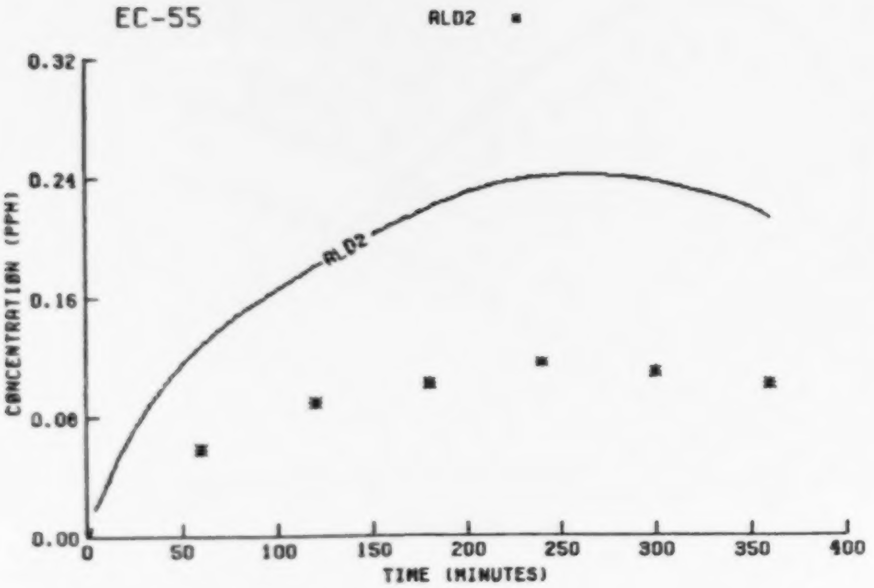

EC-5127
PRØP ✱
0.56
0.42
0.28
0.14
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PRØP

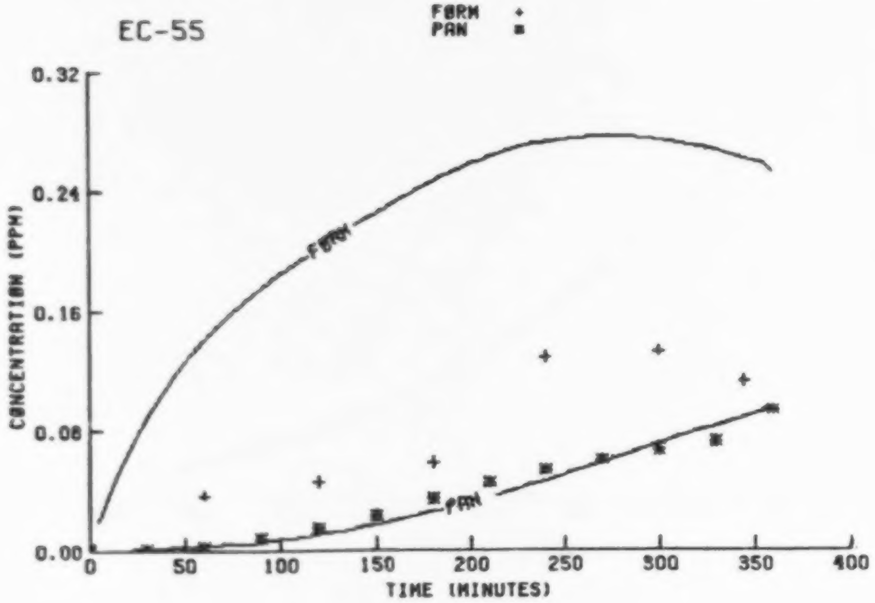

EC-5127
PAN ✱
CONCENTRATION (PPM)
0.100
0.075
0.050
0.025
0.000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

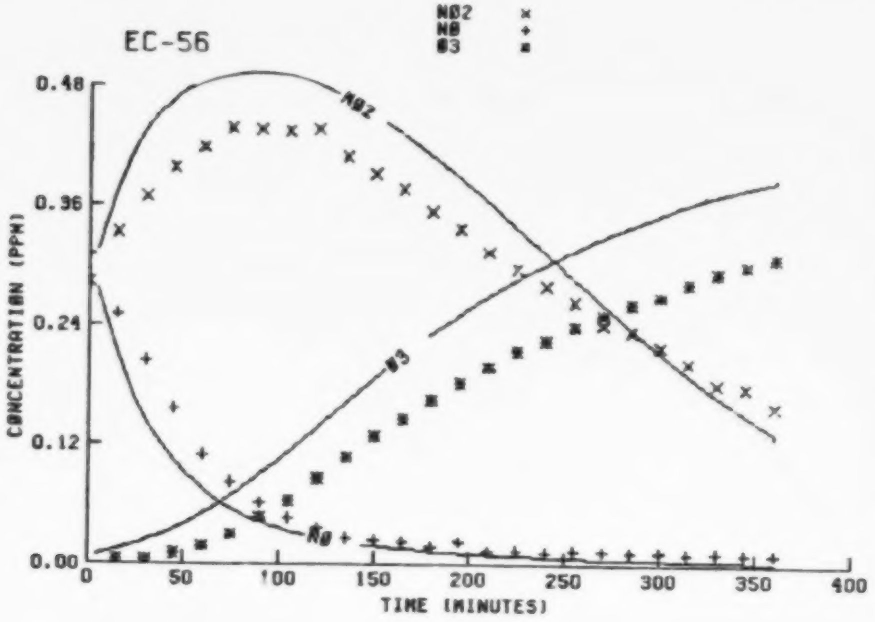

EC-5127
ALD2 +
FORM ✱
CONCENTRATION (PPM)
0.32
0.24
0.16
0.08
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
ALD2

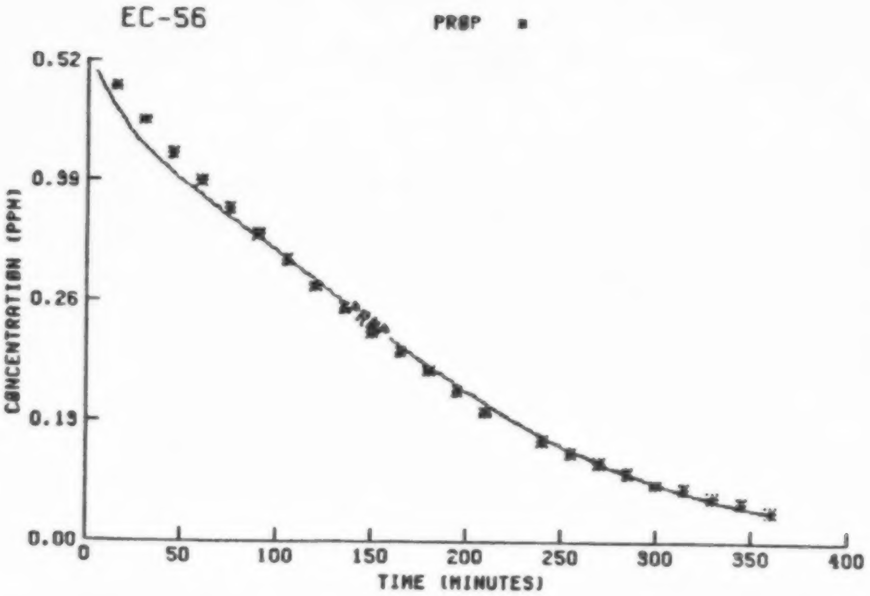

EC-55
NO2 ×
NO +
O3 ■
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3

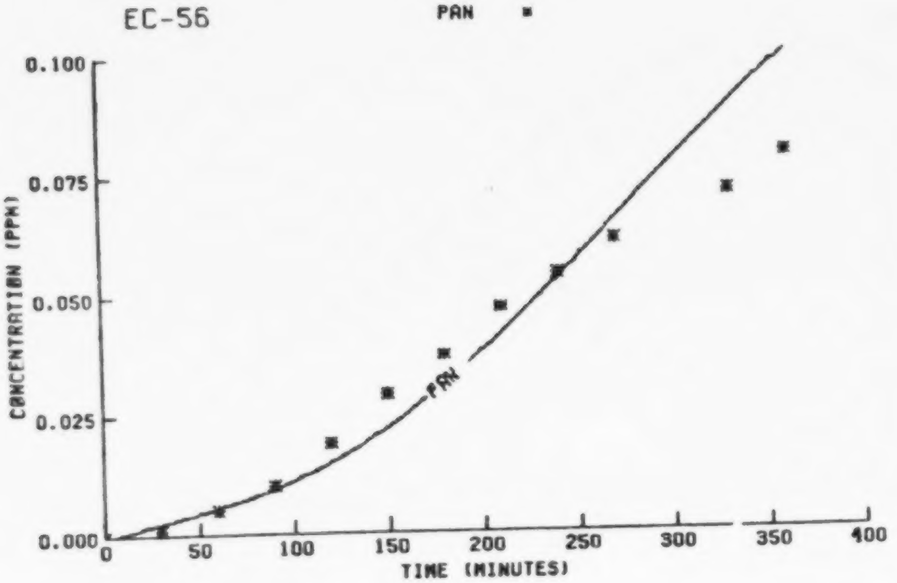

EC-55
PROP ■
0.56
0.42
0.28
0.14
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PROP

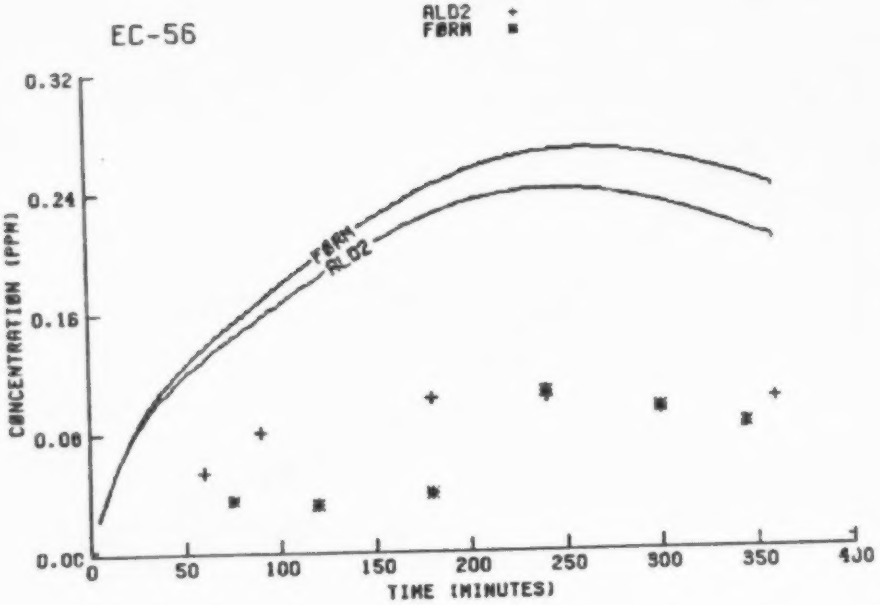

EC-55
ALD2 ■
CONCENTRATION (PPM)
0.32
0.24
0.16
0.08
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2

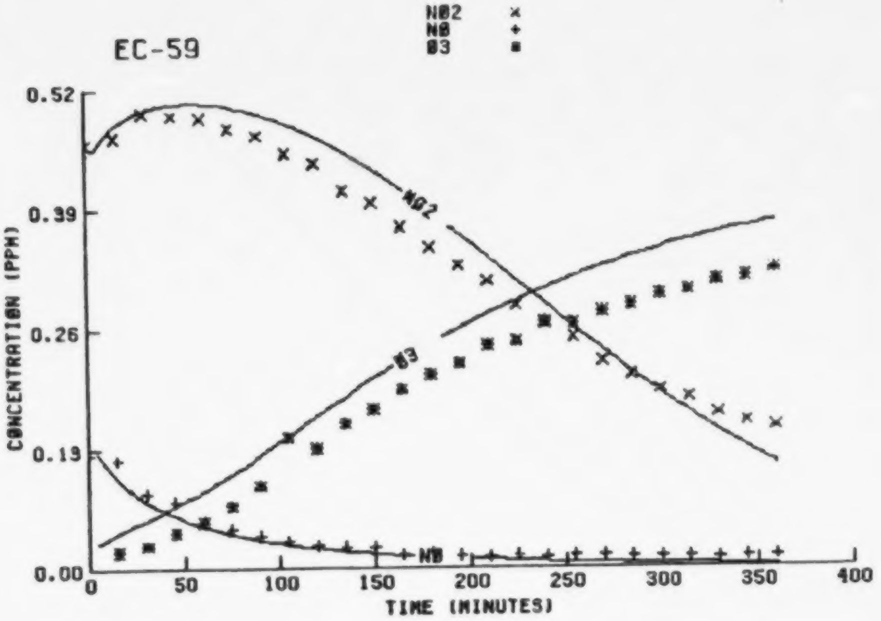

EC-55
FORM +
PAN ■
CONCENTRATION (PPM)
0.32
0.24
0.16
0.08
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PAN

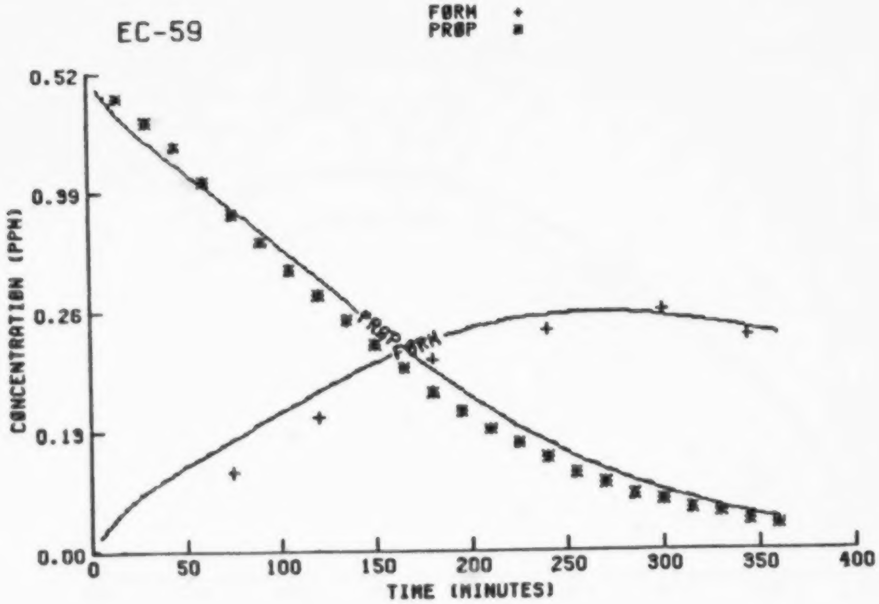

EC-56
NØ2 ×
NØ +
Ø3 ¤
0.48
0.36
0.24
0.12
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NØ2
Ø3
NØ

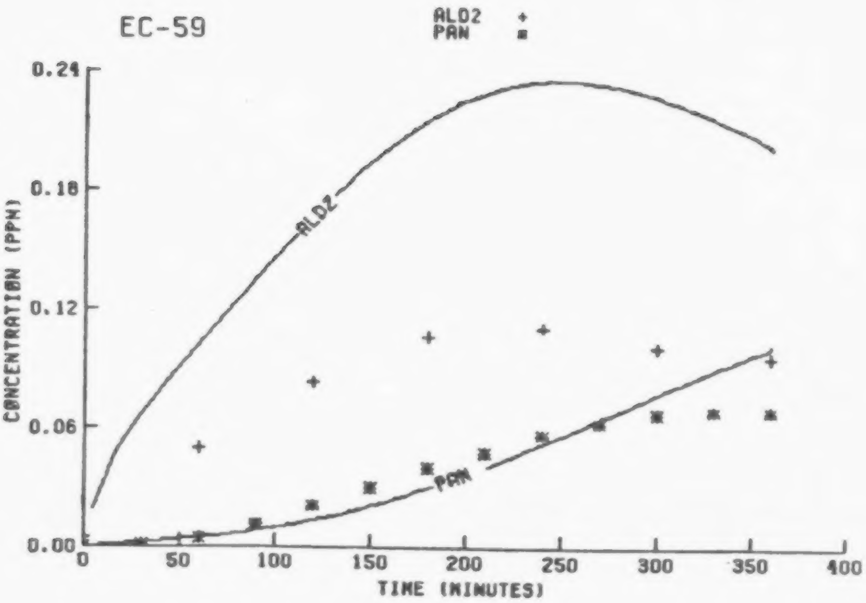

EC-56
PRØP ¤
0.52
0.39
0.26
0.13
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PRØP

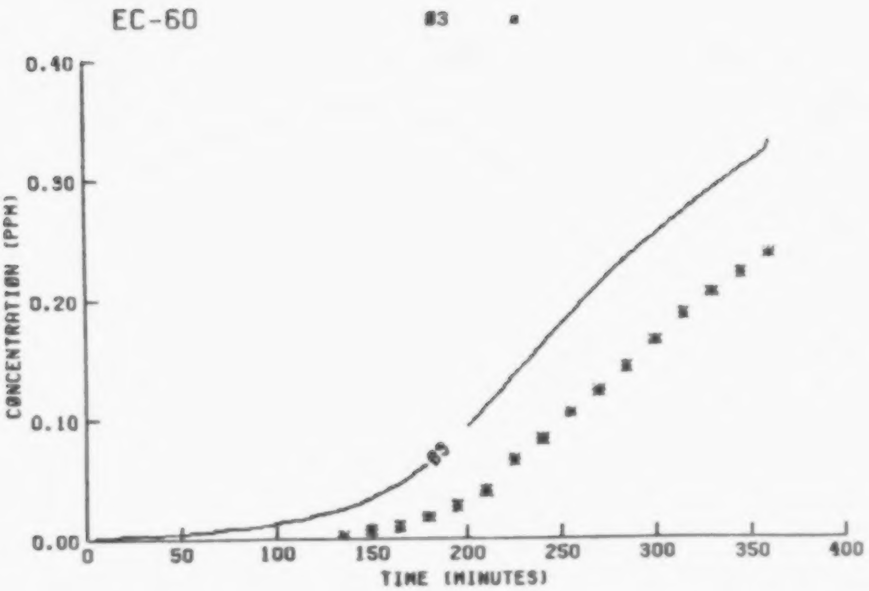

EC-56
PAN
CONCENTRATION (PPM)
0.100
0.075
0.050
0.025
0.000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

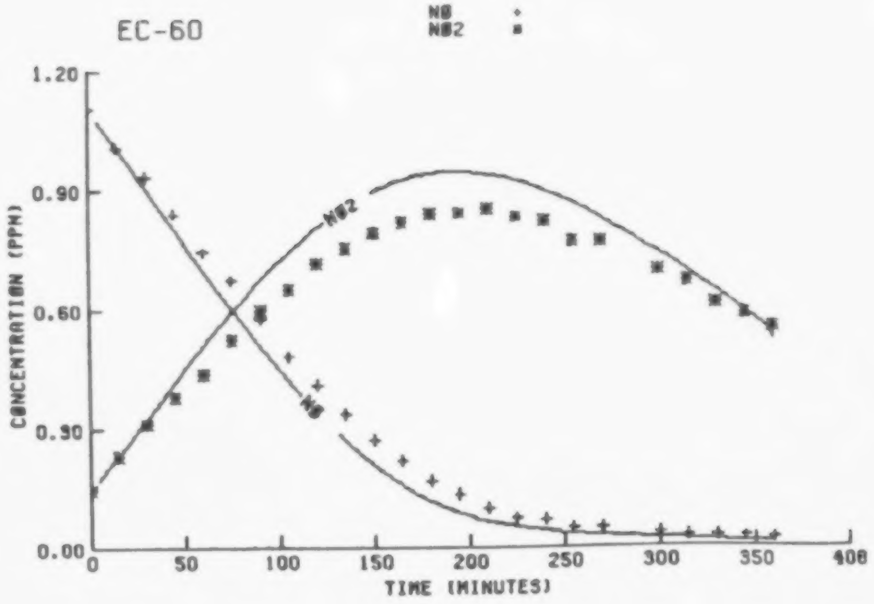

EC-56
ALD2 +
FORM
FORM
ALD2
CONCENTRATION (PPM)
0.32
0.24
0.16
0.08
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

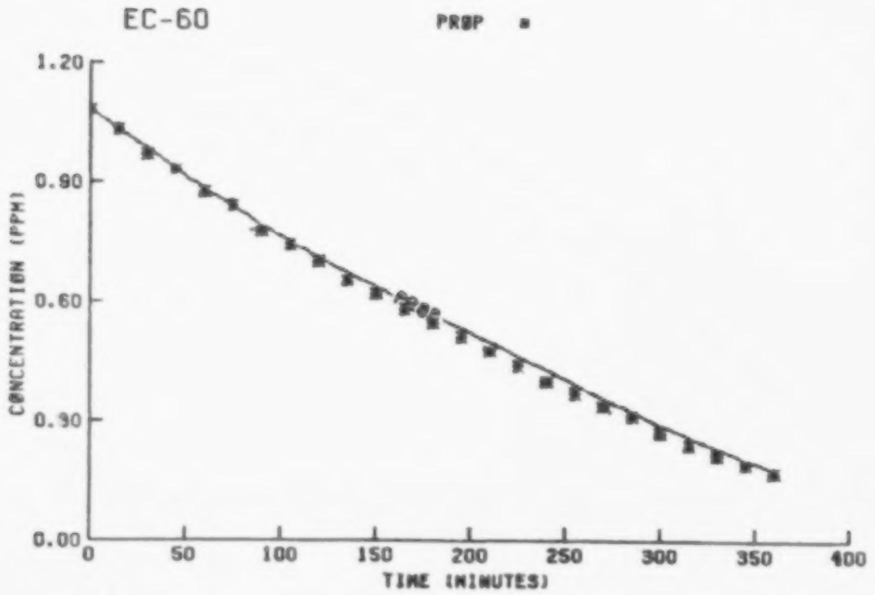

EC-59
NO2 ×
NO +
O3 ▨
NO2
O3
NO
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

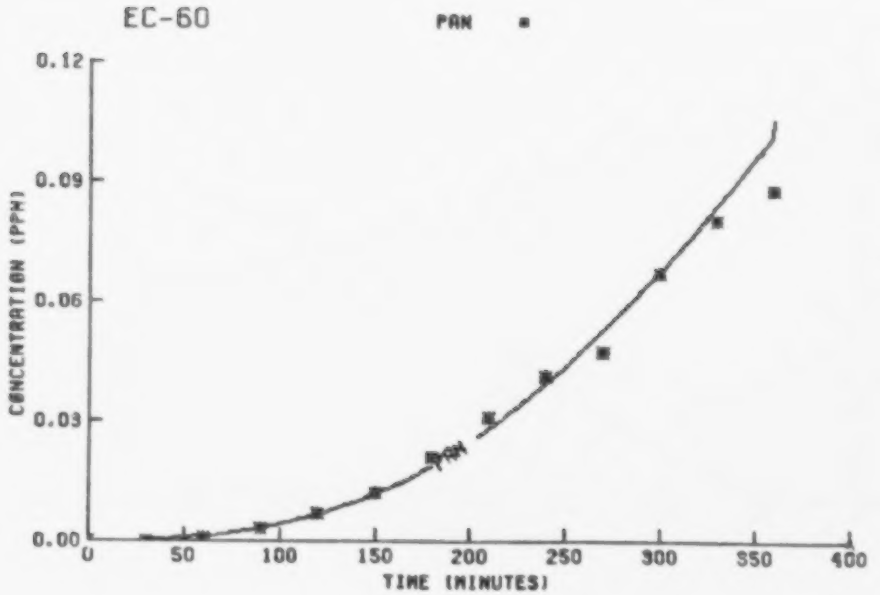

EC-59
FORM +
PROP ▨
PROP
FORM
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

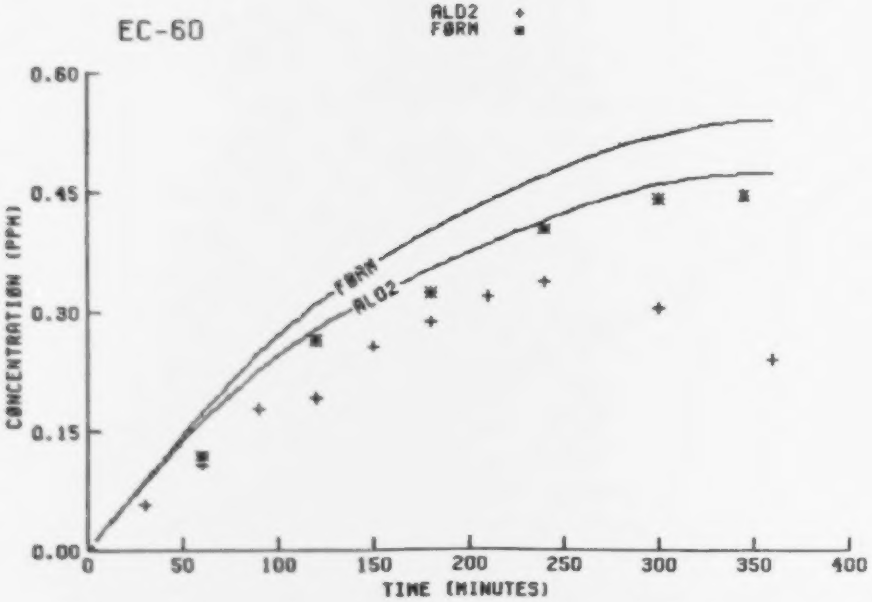
EC-59
ALD2 +
PAN ⁎
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

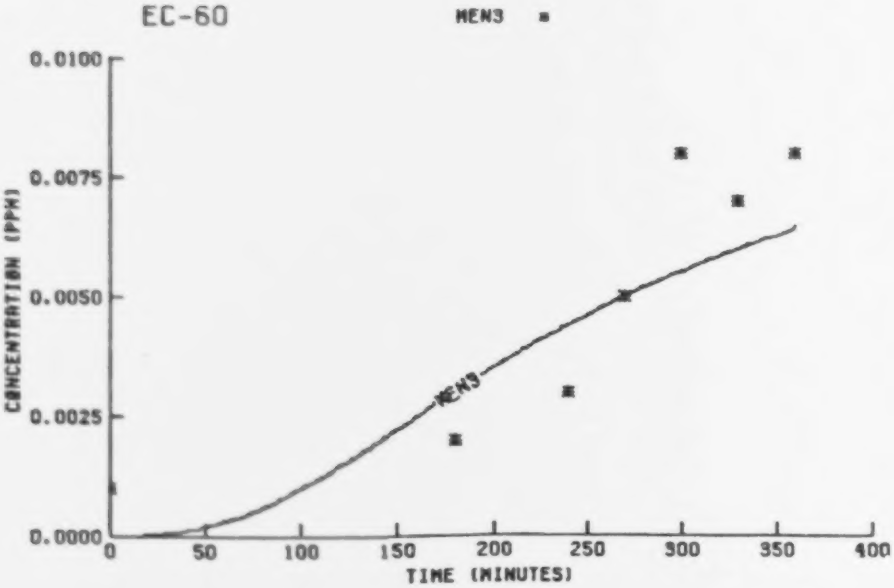

EC-60
O3
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

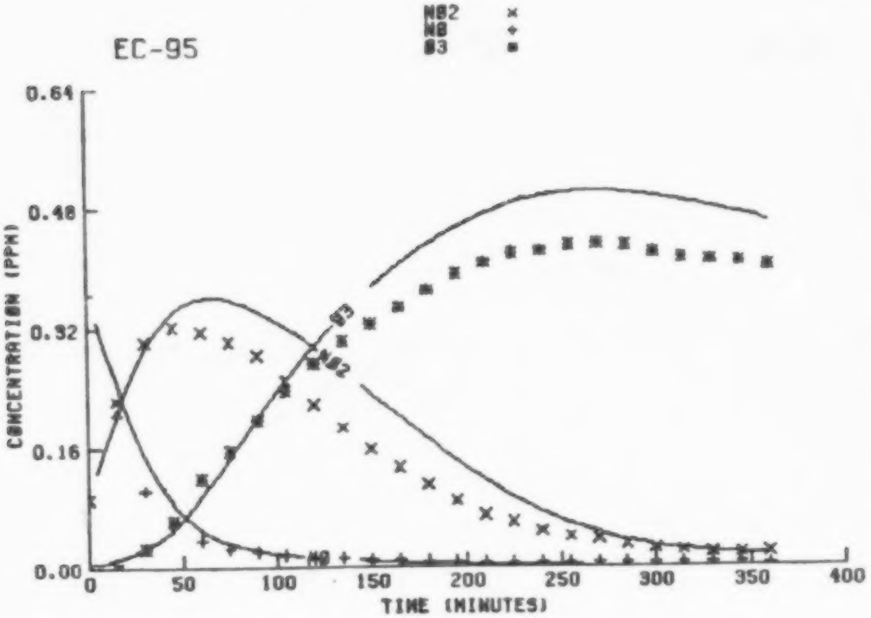

EC-60
NO
NO2
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

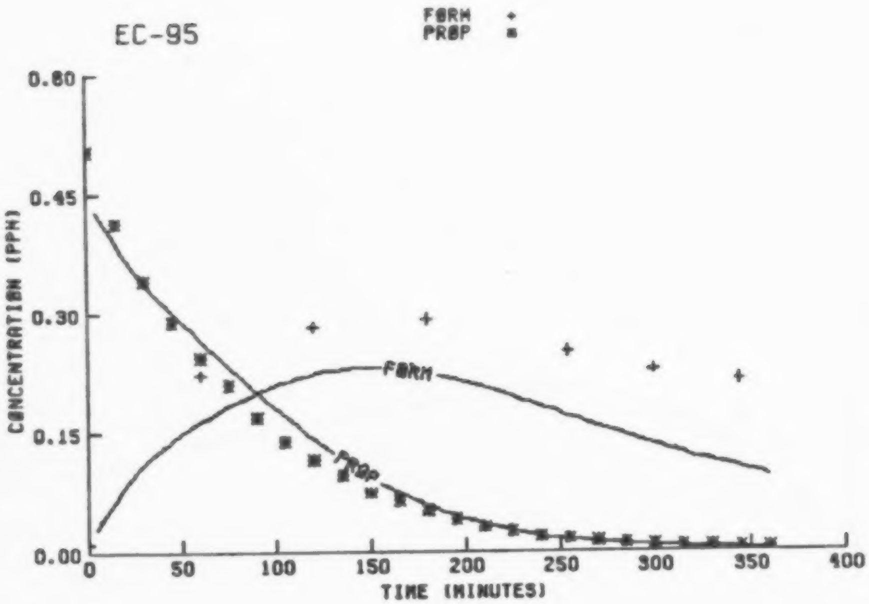

EC-60
PRØP ■
1.20
0.90
0.60
0.30
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PRØP

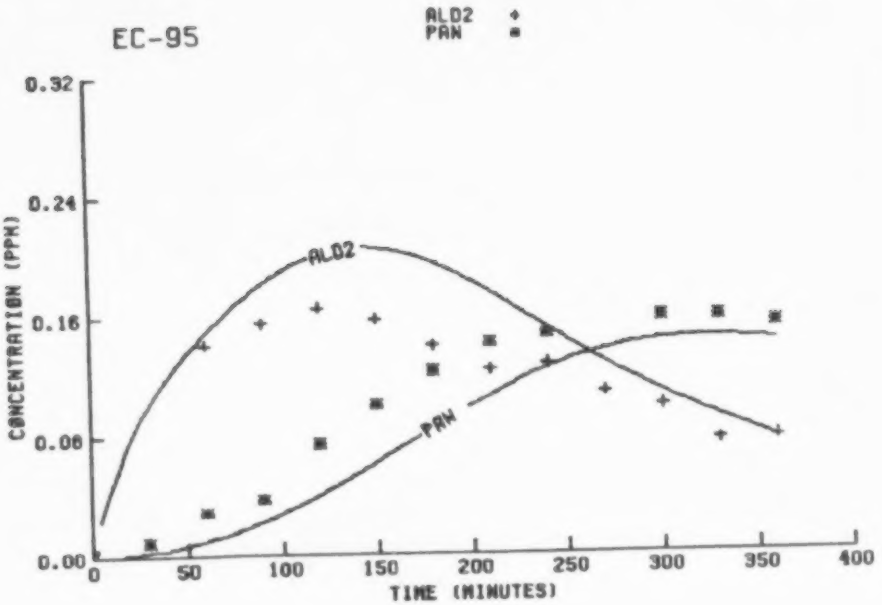

EC-60
PAN ■
0.12
0.09
0.06
0.03
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

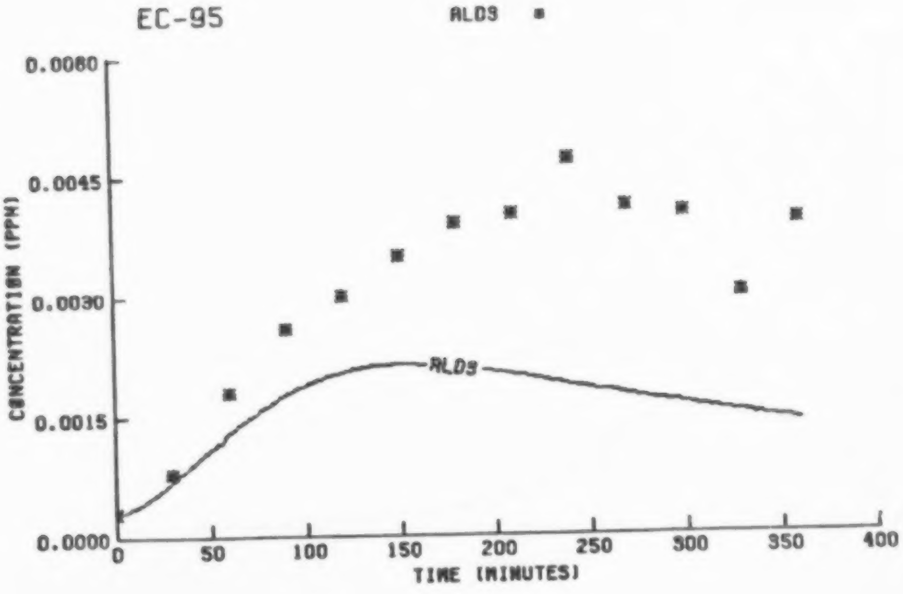

EC-60
ALD2 +
FØRM ■
FØRM
ALD2
CONCENTRATIØN (PPM)
0.00
0.15
0.30
0.45
0.60
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

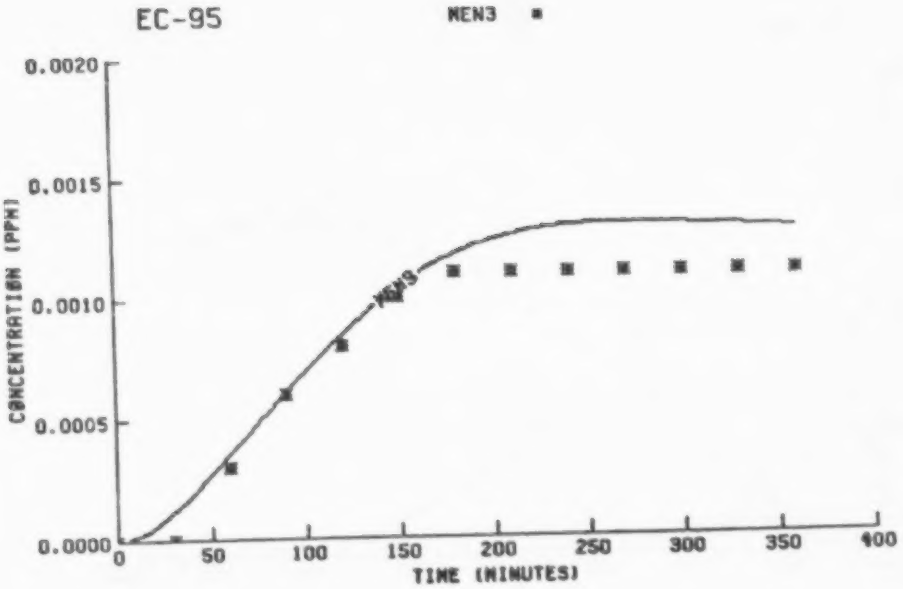

EC-60
MEN3 ■
MEN3
CONCENTRATIØN (PPM)
0.0000
0.0025
0.0050
0.0075
0.0100
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

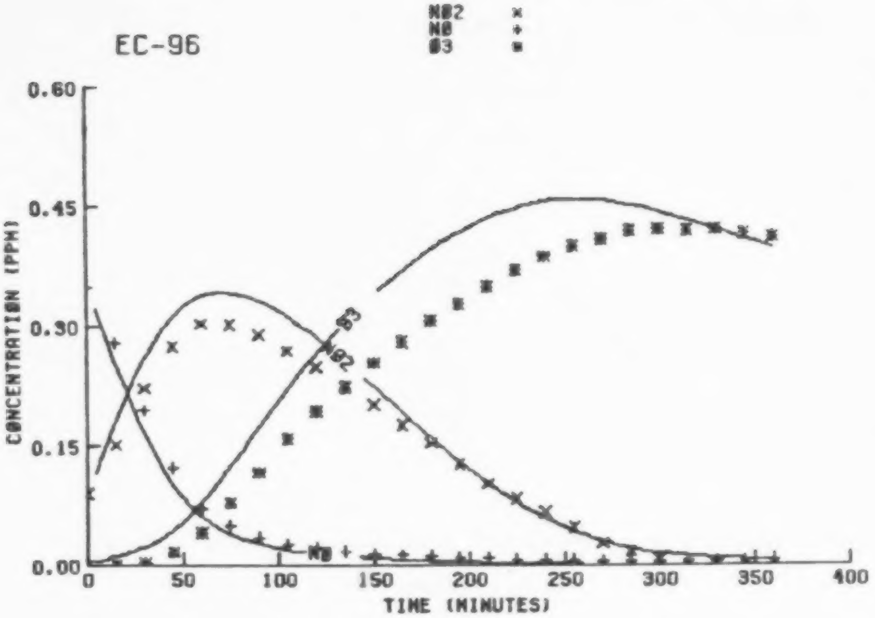

EC-95
NØ2 ×
NØ +
Ø3 ■
CONCENTRATIØN (PPM)
0.64
0.48
0.32
0.16
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
Ø3
NØ2
NØ

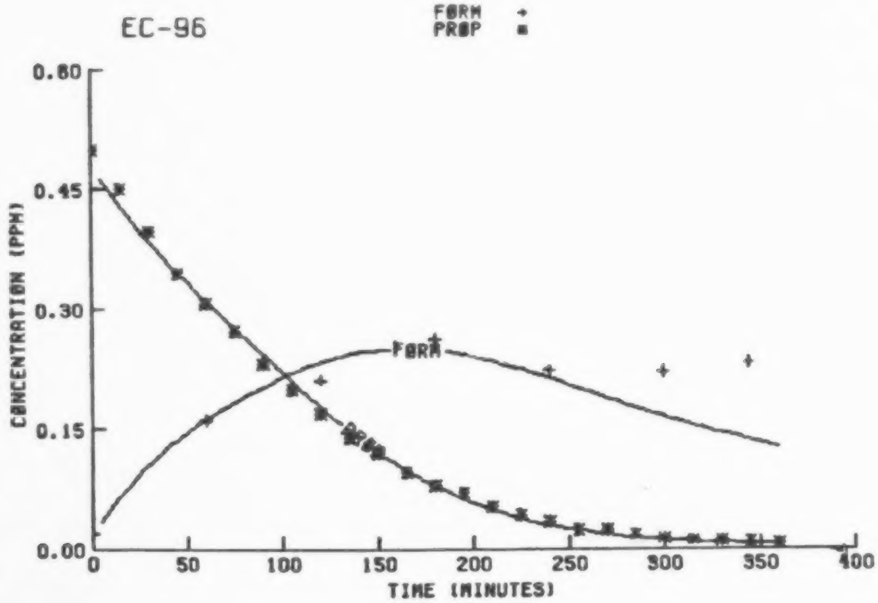

EC-95
FØRM +
PRØP ■
CONCENTRATIØN (PPM)
0.60
0.45
0.30
0.15
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FØRM
PRØP

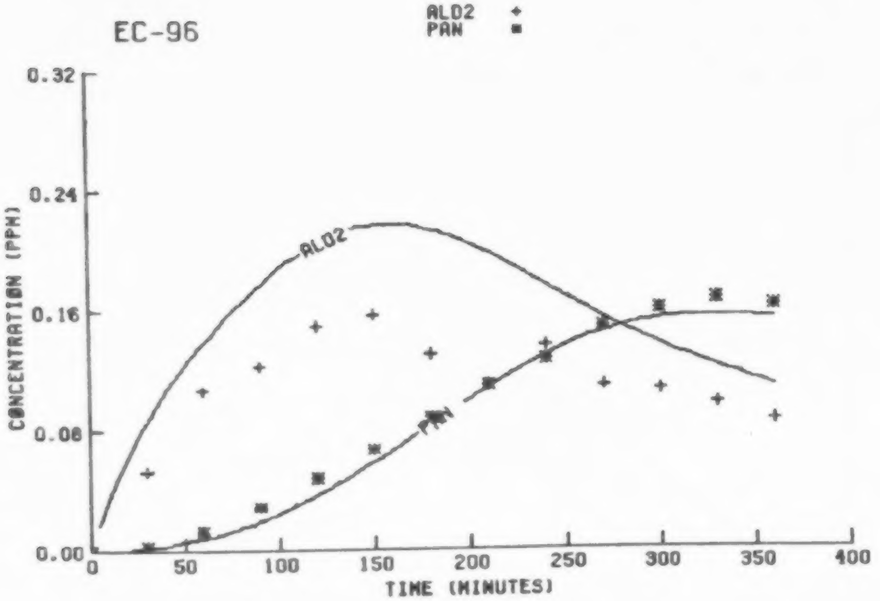

EC-95
ALD2 +
PAN ▪
0.32
0.24
0.16
0.08
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

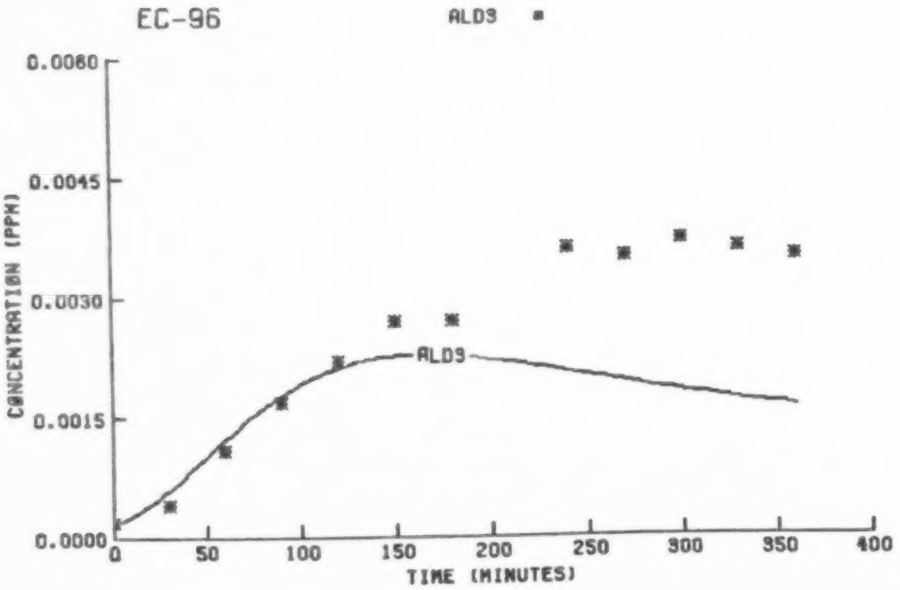

EC-95
ALD3 ▪
0.0060
0.0045
0.0030
0.0015
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3

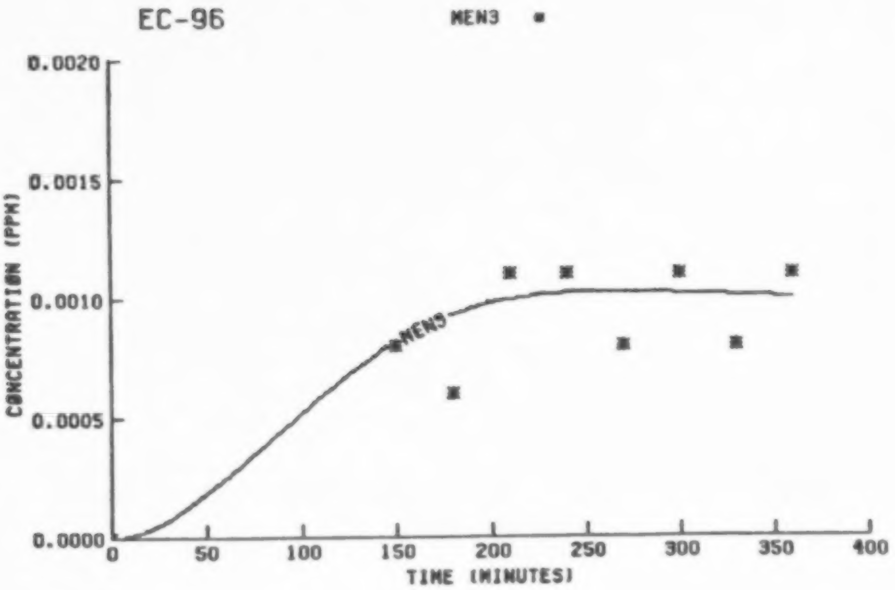

EC-95
MEN3 ■
0.0020
0.0015
0.0010
0.0005
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3

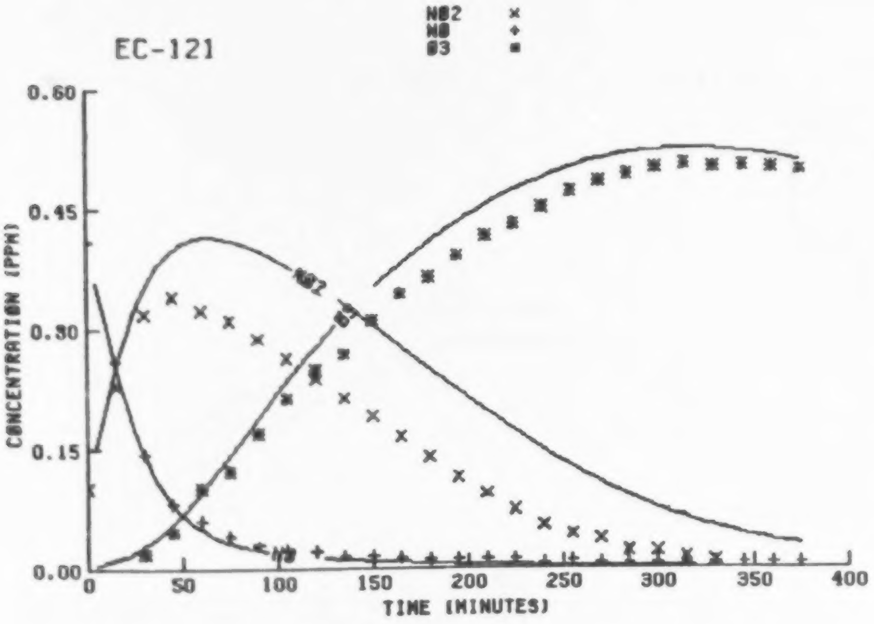

EC-96
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.60
0.45
0.30
0.15
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
O3
NO2
NO

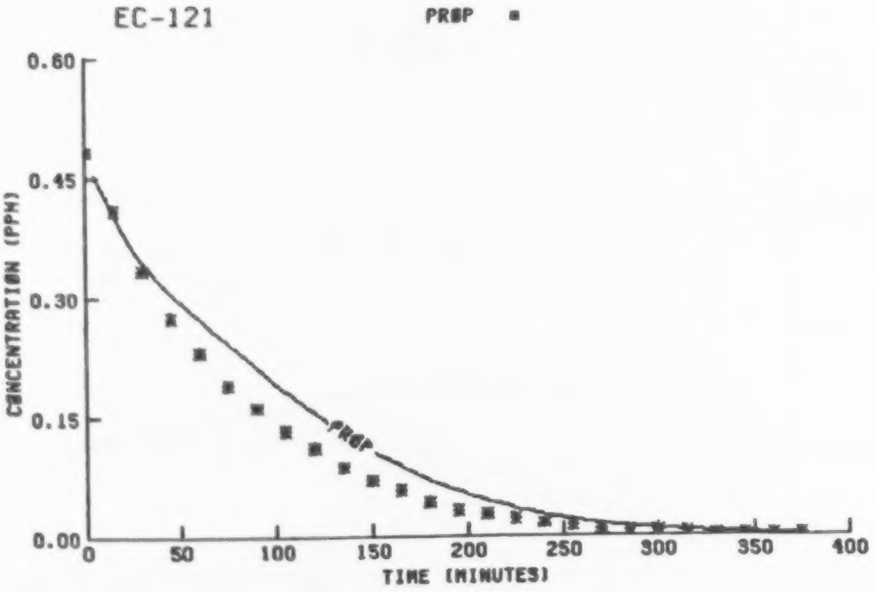

EC-96
FORM +
PROP ✱
CONCENTRATION (PPM)
0.60
0.45
0.30
0.15
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
FORM
PROP

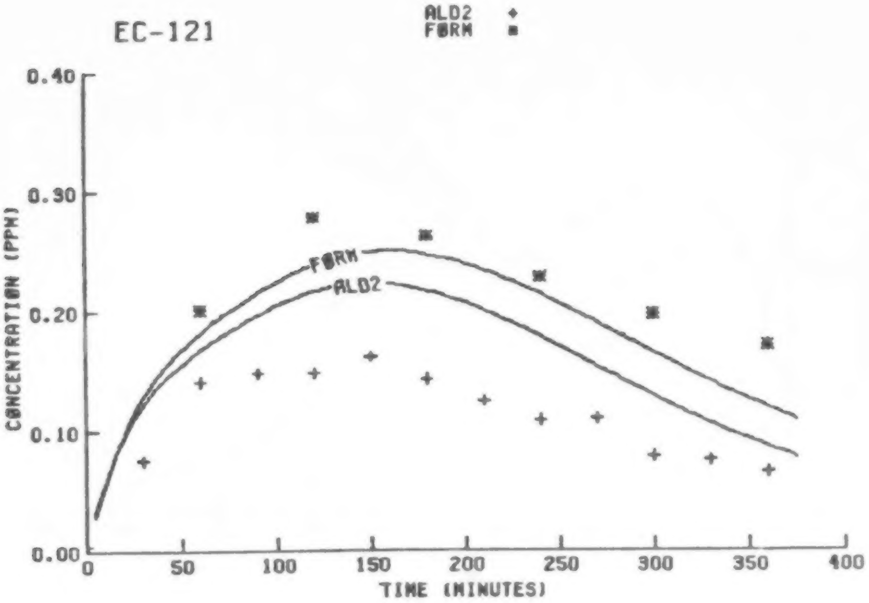

EC-96
ALD2 +
PAN ✱
0.32
0.24
0.16
0.08
0.00
CONCENTRATION (PPM)
ALD2
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

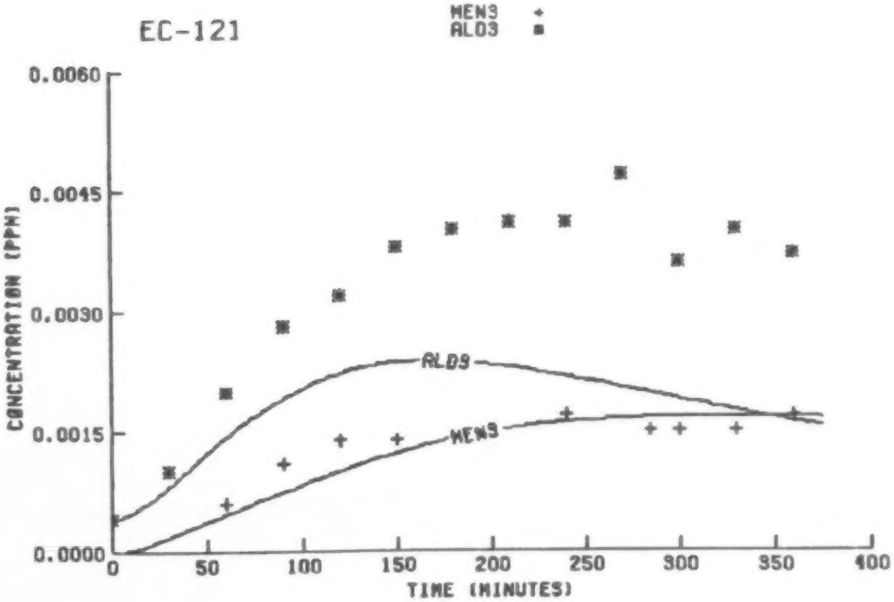

EC-96
ALD3 ✱
0.0060
0.0045
0.0030
0.0015
0.0000
CONCENTRATION (PPM)
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

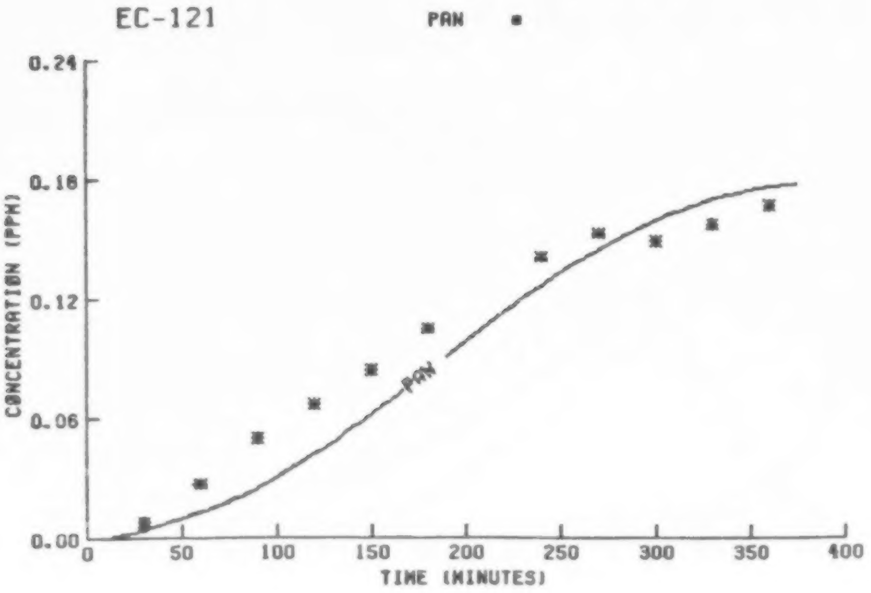

EC-96
MEN3 ✱
0.0020
0.0015
0.0010
0.0005
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3

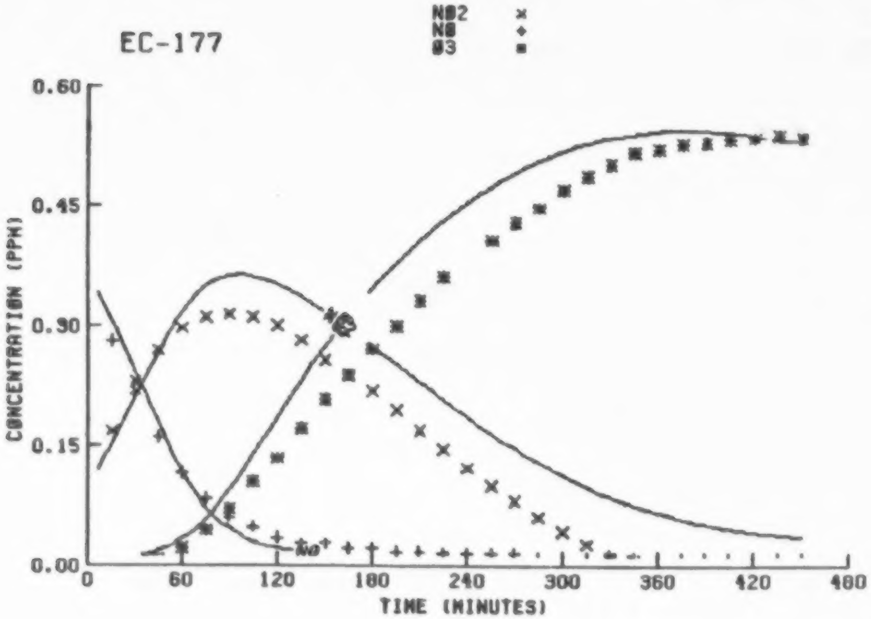

EC-121
NO2 ×
NO +
O3 ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3

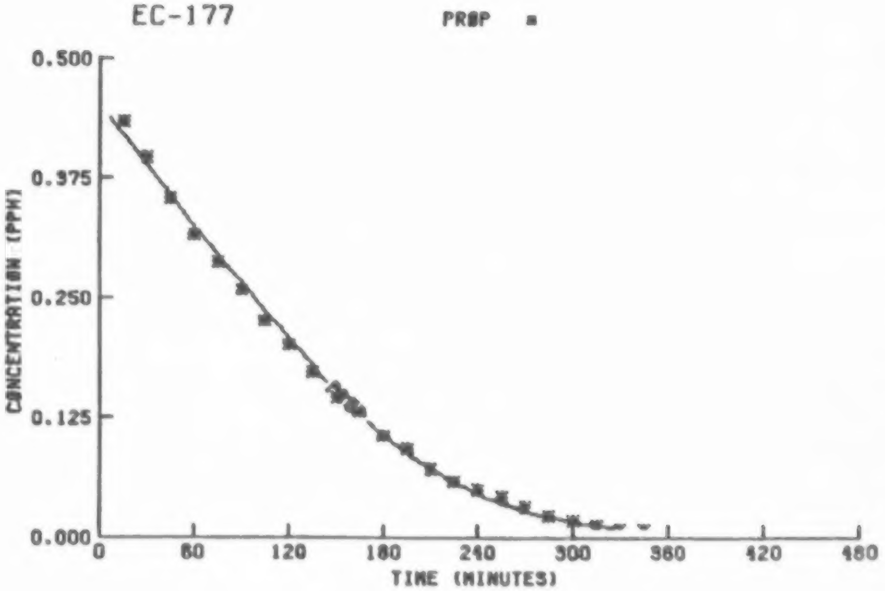

EC-121
PROP ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PROP

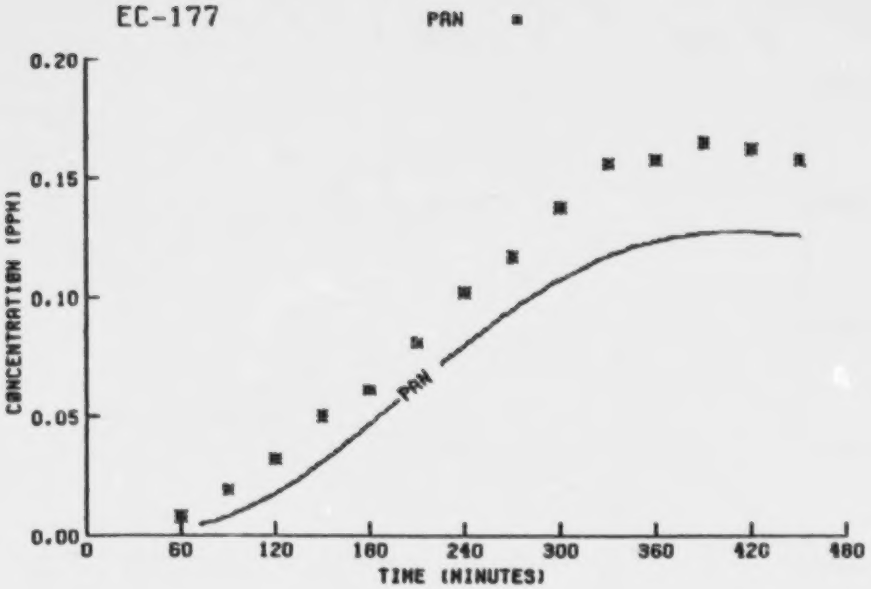

EC-121
ALD2 +
FØRM ✱
0.40
0.30
0.20
0.10
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FØRM
ALD2

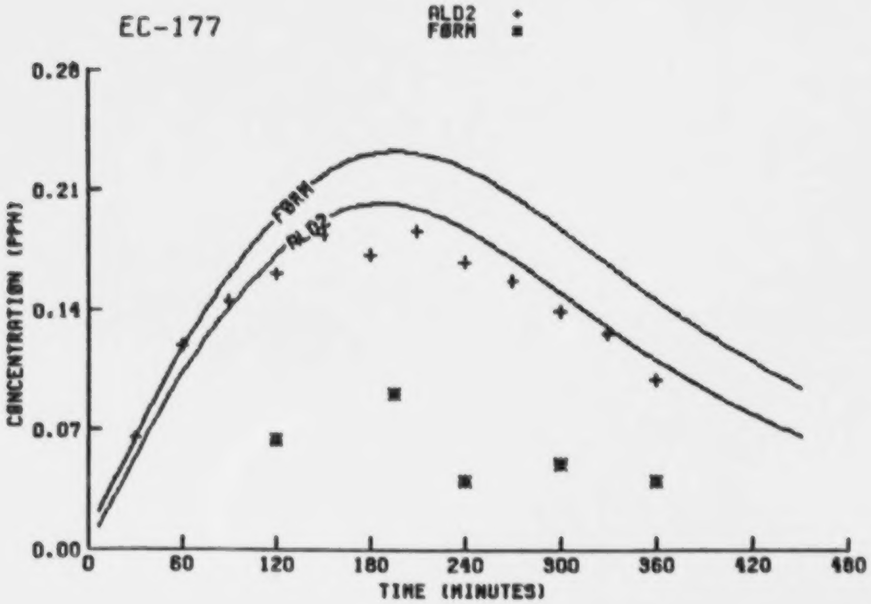

EC-121
MEN3 +
ALD3 ✱
0.0060
0.0045
0.0030
0.0015
0.0000
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3
MEN3

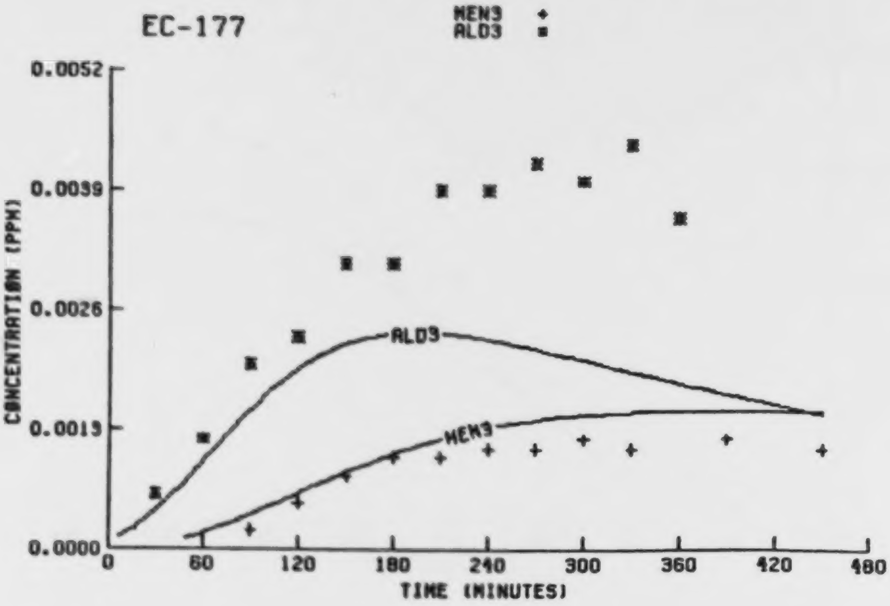

EC-121
PAN
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

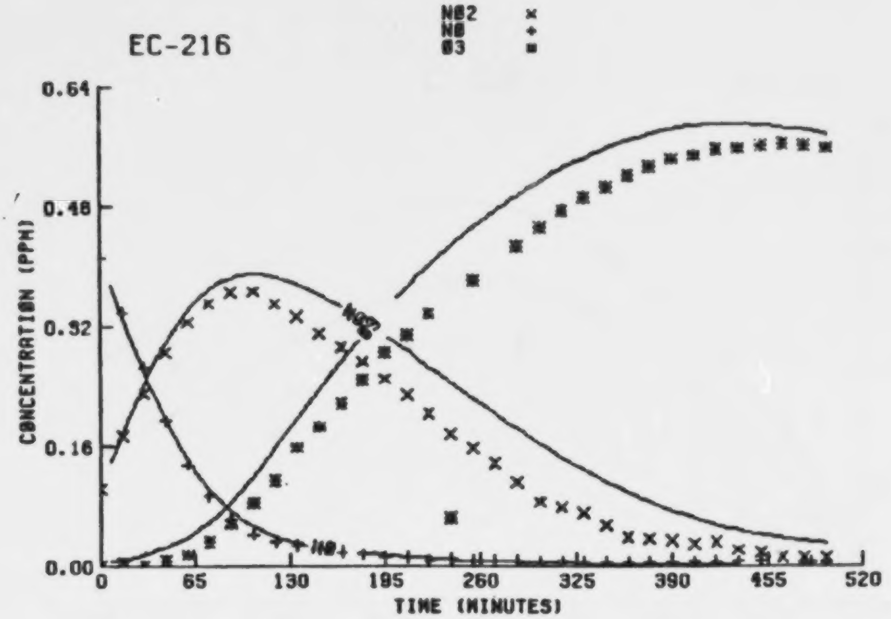

EC-177
NO2 ×
NO +
O3 ■
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
NO

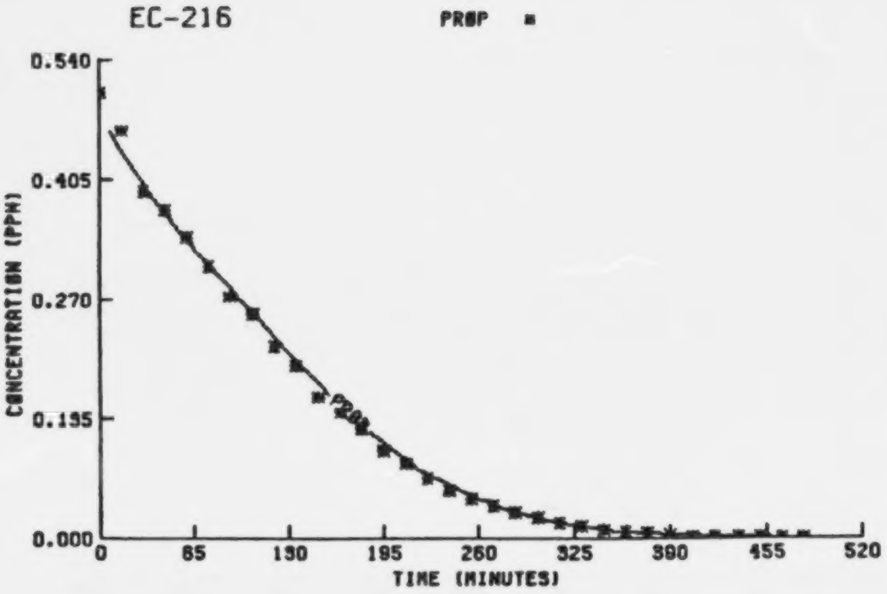

EC-177
PROP ■
0.500
0.375
0.250
0.125
0.000
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

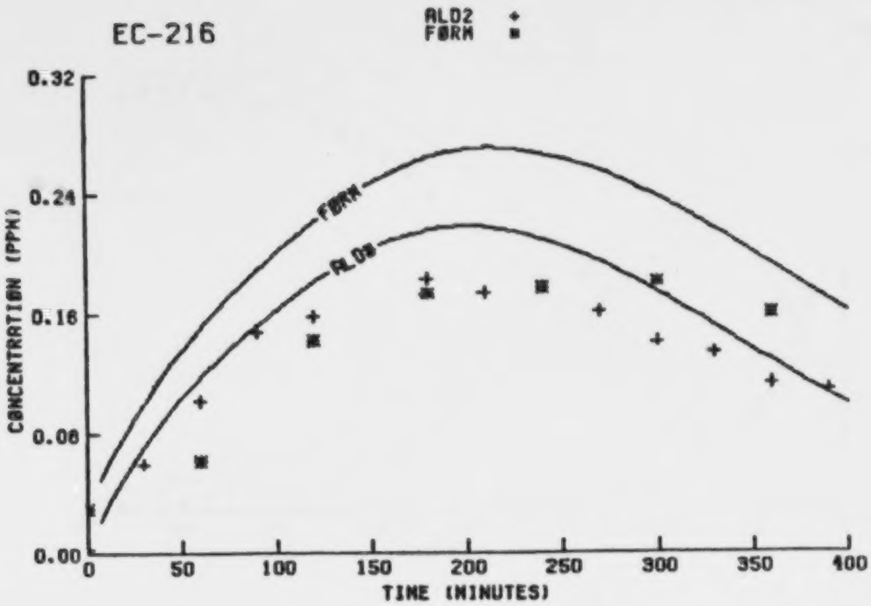

EC-177
PAN ■
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
PAN

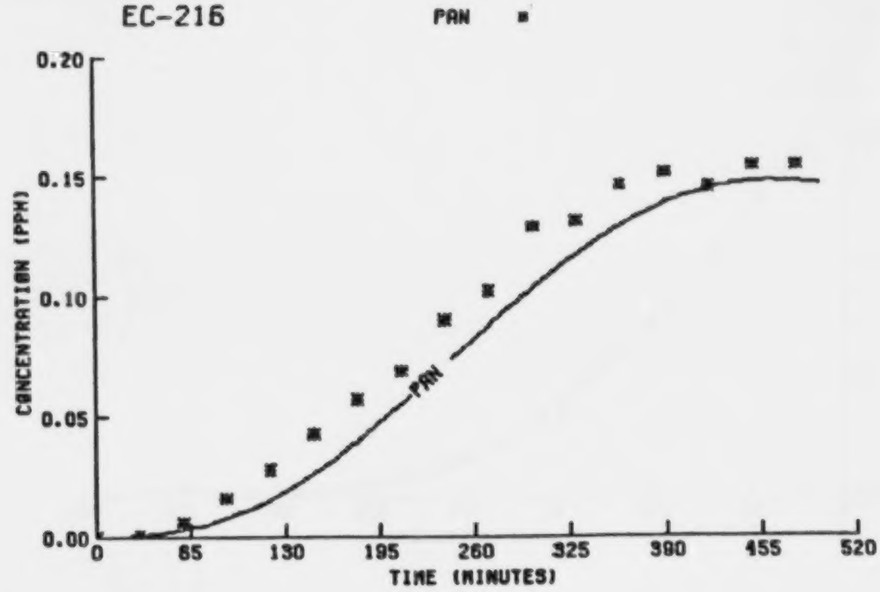

EC-177
ALD2 +
FORM ■
0.28
0.21
0.14
0.07
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
FORM
ALD2

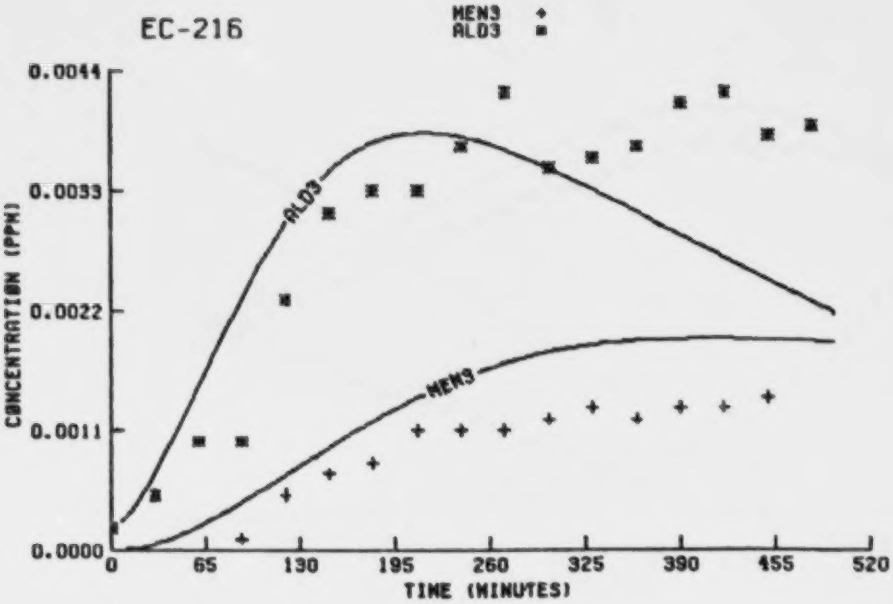

EC-177
MEN3 +
ALD3 ✱
CONCENTRATION (PPM)
0.0052
0.0039
0.0026
0.0013
0.0000
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD3
MEN3

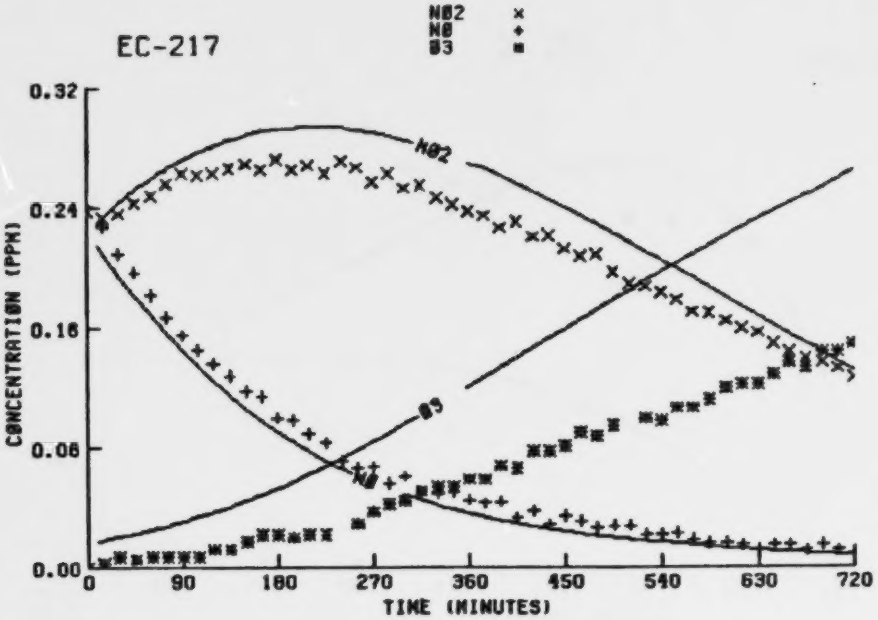

EC-216
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.64
0.48
0.32
0.16
0.00
TIME (MINUTES)
0
65
130
195
260
325
390
455
520
NO2
NO

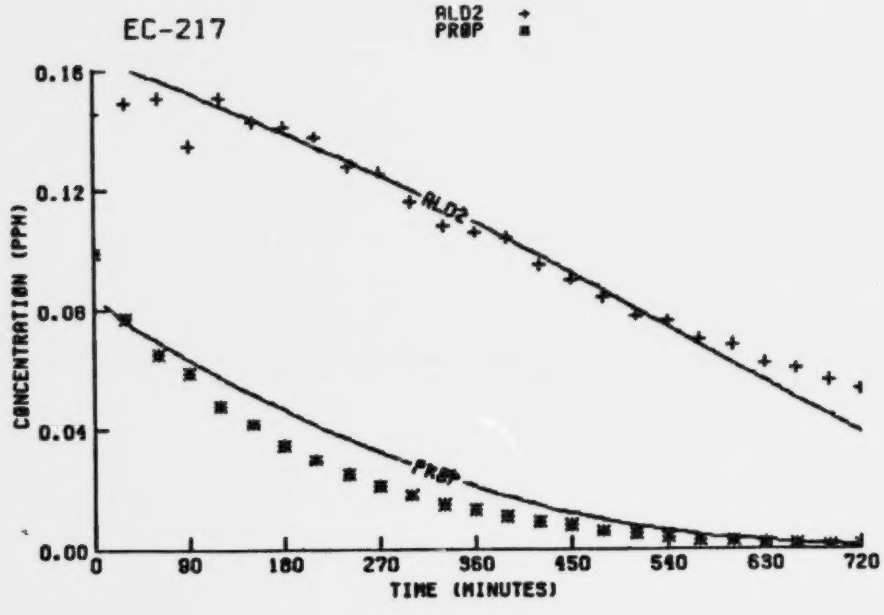

EC-216
PROP ✱
CONCENTRATION (PPM)
0.540
0.405
0.270
0.135
0.000
TIME (MINUTES)
0
65
130
195
260
325
390
455
520
PROP

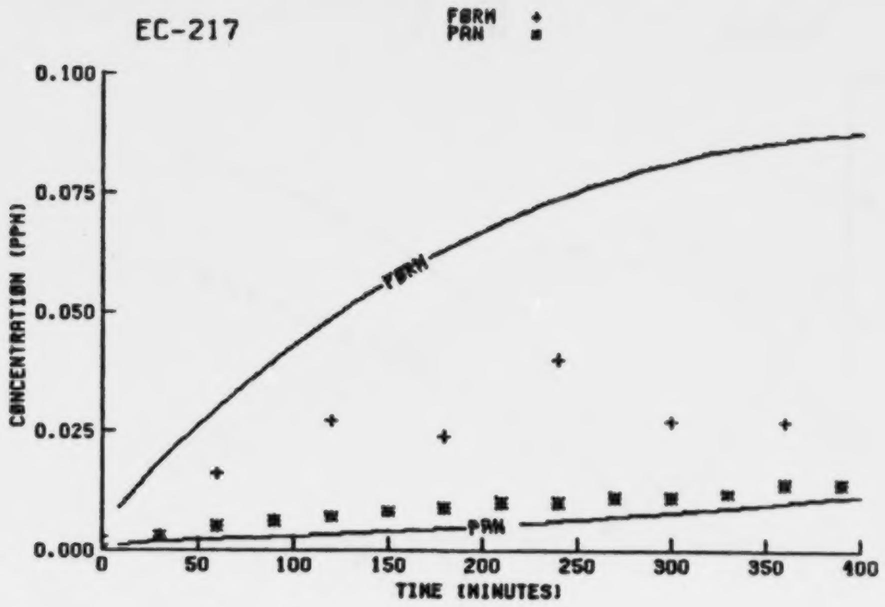

EC-216
ALD2 +
FØRM ✱
0.32
0.24
0.16
0.08
0.00
CØNCENTRATIØN (PPM)
FØRM
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

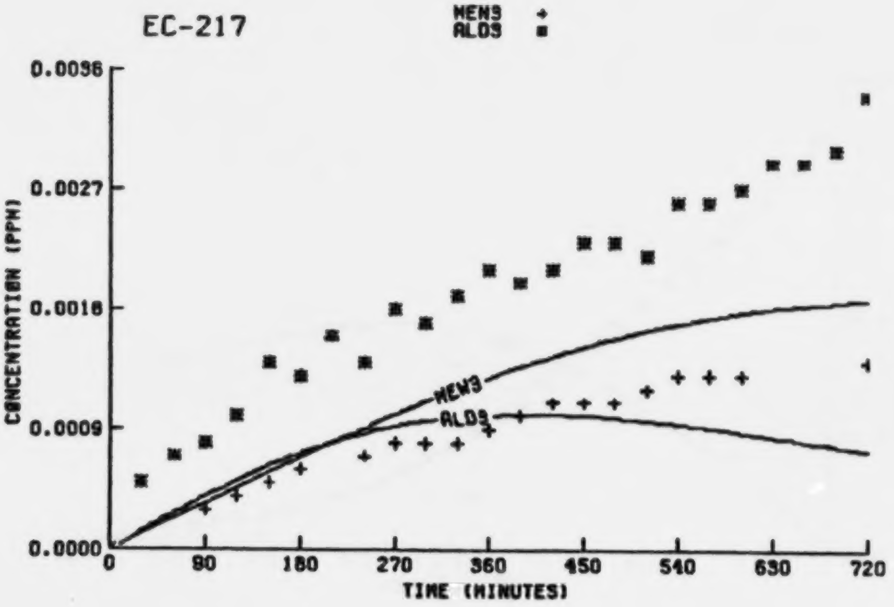

EC-216
PAN ✱
0.20
0.15
0.10
0.05
0.00
CØNCENTRATIØN (PPM)
PAN
0
65
130
195
260
325
390
455
520
TIME (MINUTES)

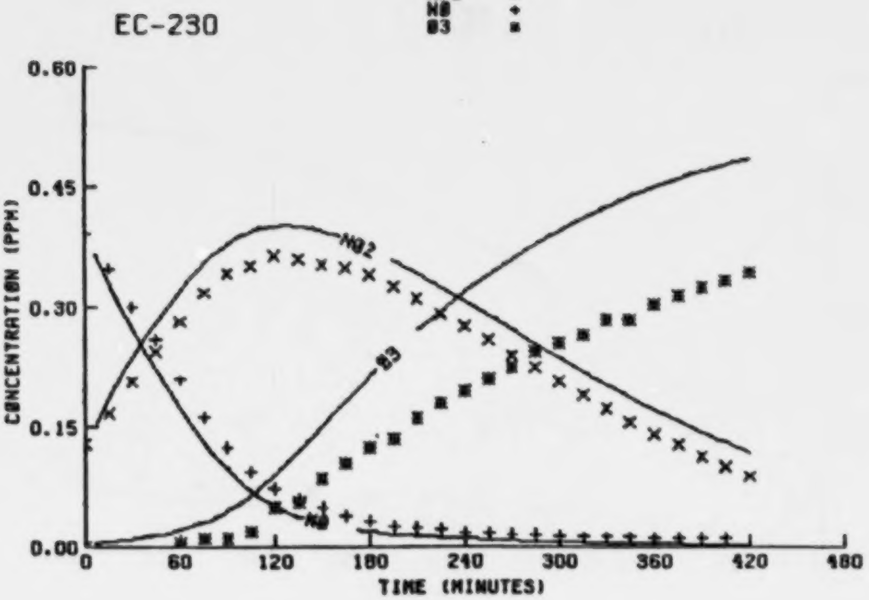

EC-216
MEN3 +
ALD3 ✱
0.0044
0.0033
0.0022
0.0011
0.0000
CONCENTRATION (PPM)
0
65
130
195
260
325
390
455
520
TIME (MINUTES)
ALD3
MEN3

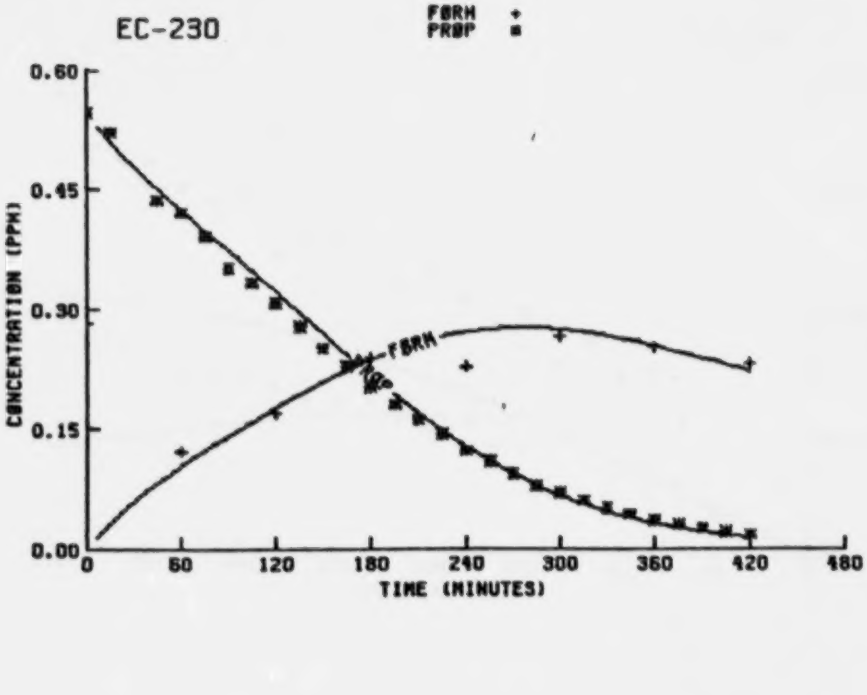

EC-217
NO2 ×
NO +
O3 ■
0.32
0.24
0.16
0.08
0.00
CONCENTRATION (PPM)
NO2
O3
NO
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

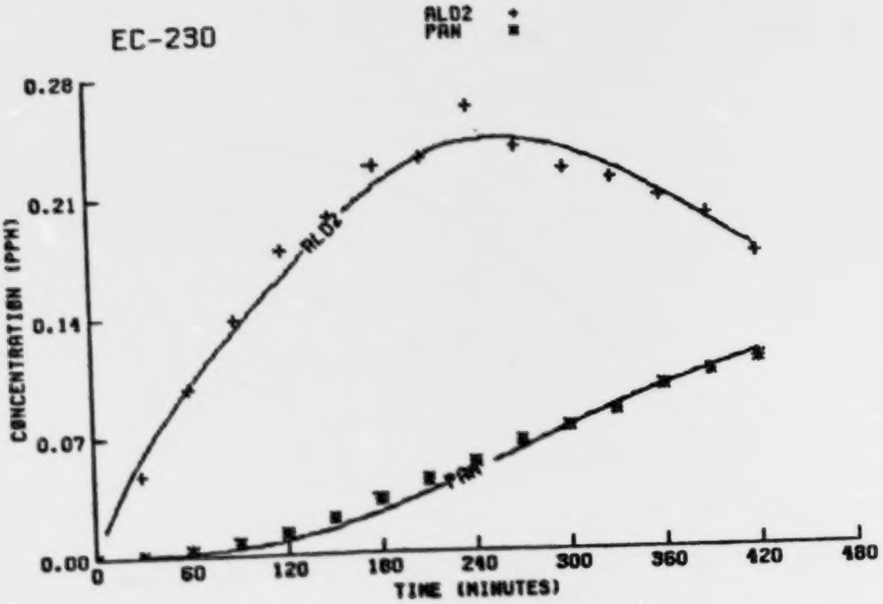

EC-217
ALD2 +
PROP ■
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
ALD2
PROP
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

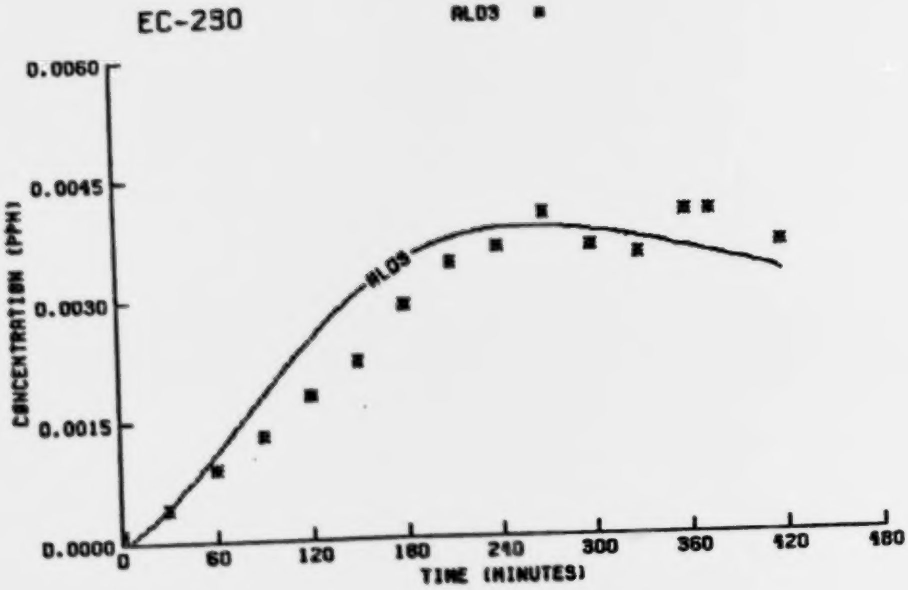

EC-217
FØRM +
PAN ■
0.100
0.075
0.050
0.025
0.000
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FØRM
PAN

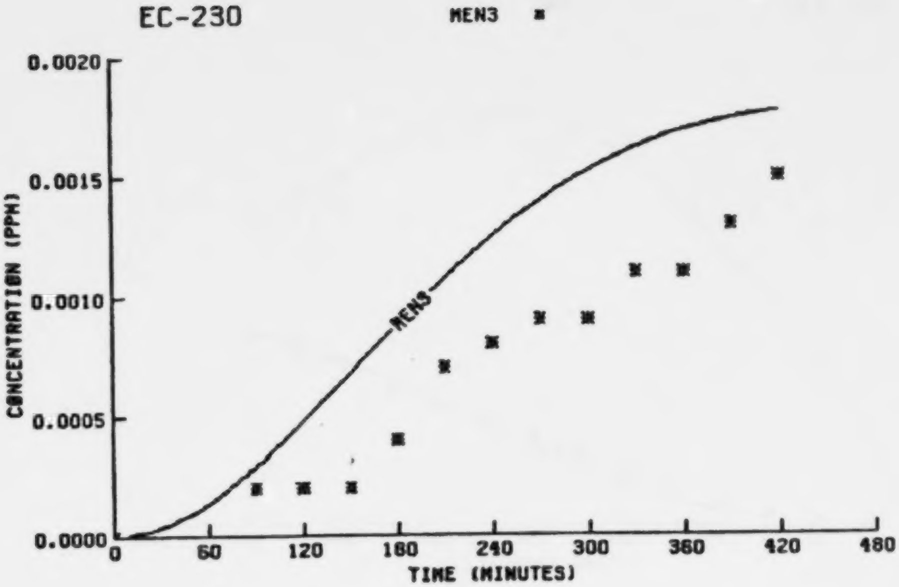

EC-217
MEK3 +
ALD3 ■
0.0036
0.0027
0.0018
0.0009
0.0000
CØNCENTRATIØN (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
MEK3
ALD3

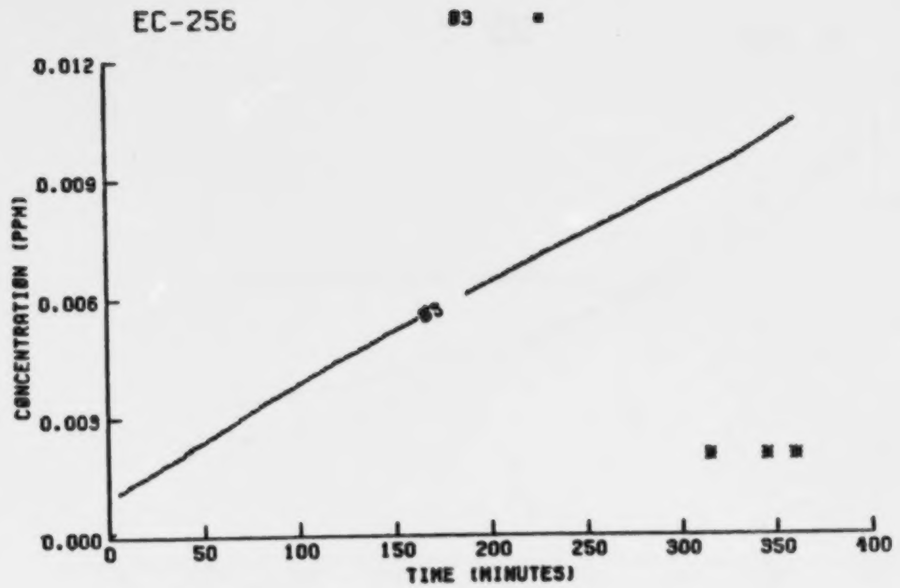

EC-230
NO2 ×
NO +
O3 ▪
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
NO2
O3
NO

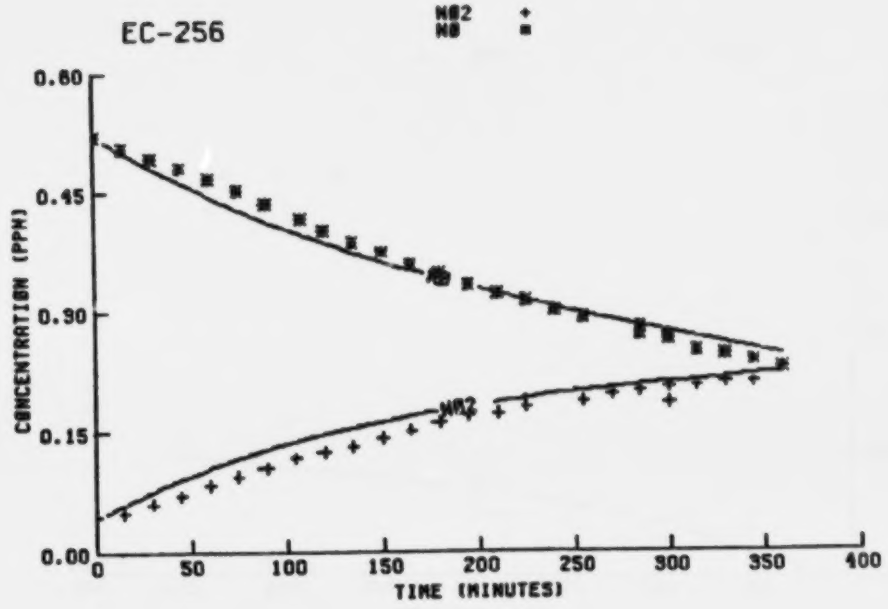

EC-230
FORM +
PROP ▪
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
FORM
PROP

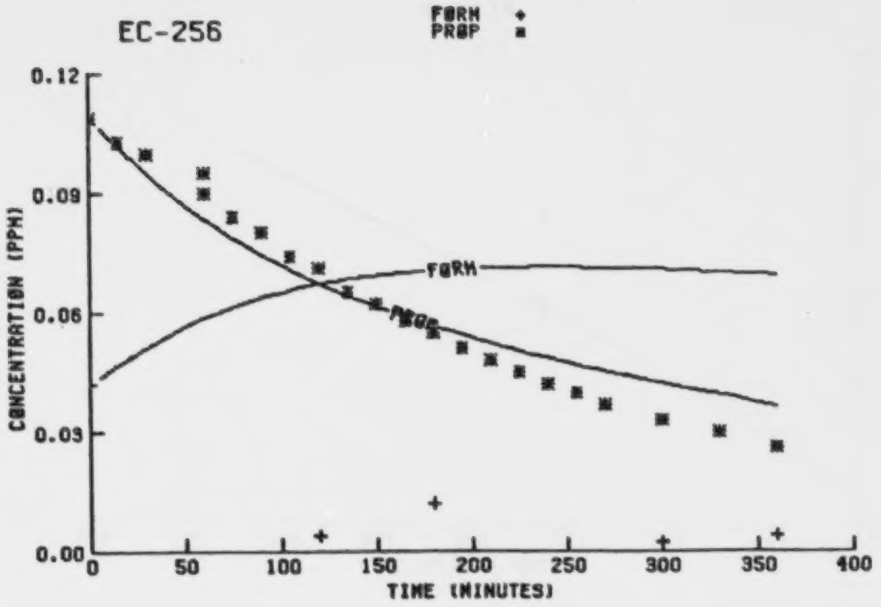

EC-230
ALD2 +
PAN ✱
0.28
0.21
0.14
0.07
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD2
PAN

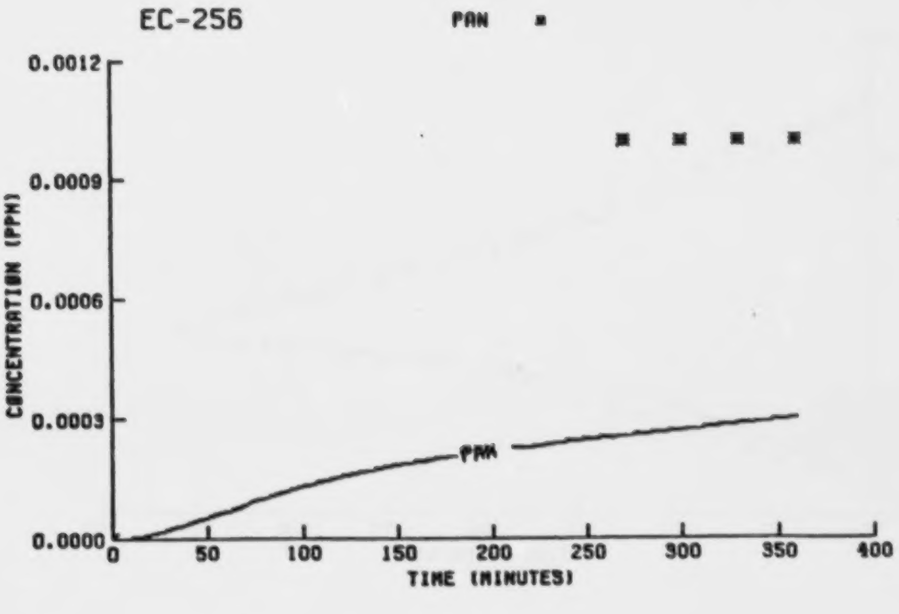

EC-230
ALD3 ✱
0.0060
0.0045
0.0030
0.0015
0.0000
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD3

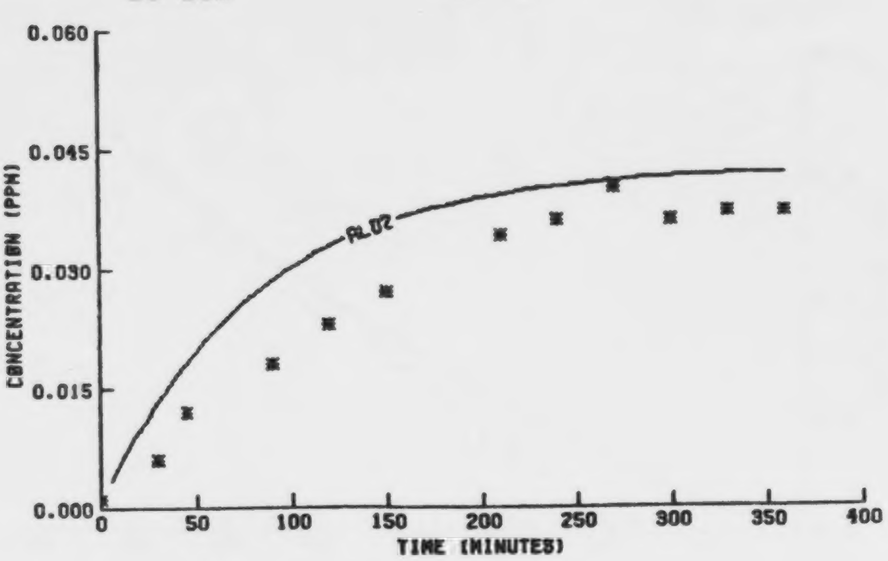
EC-230
MEN3 ✱
0.0020
0.0015
0.0010
0.0005
0.0000
CONCENTRATION (PPM)
MEN3
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

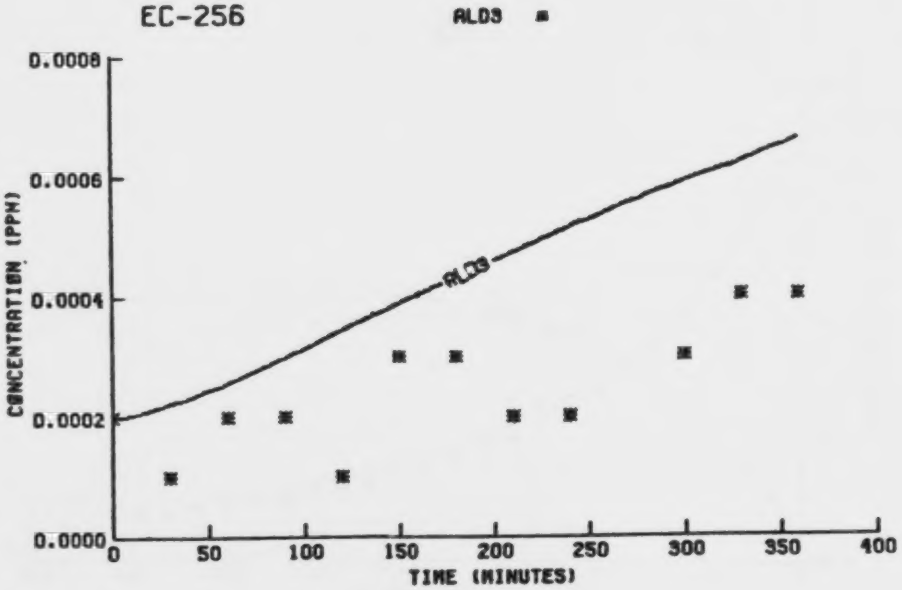

EC-256
O3 ×
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

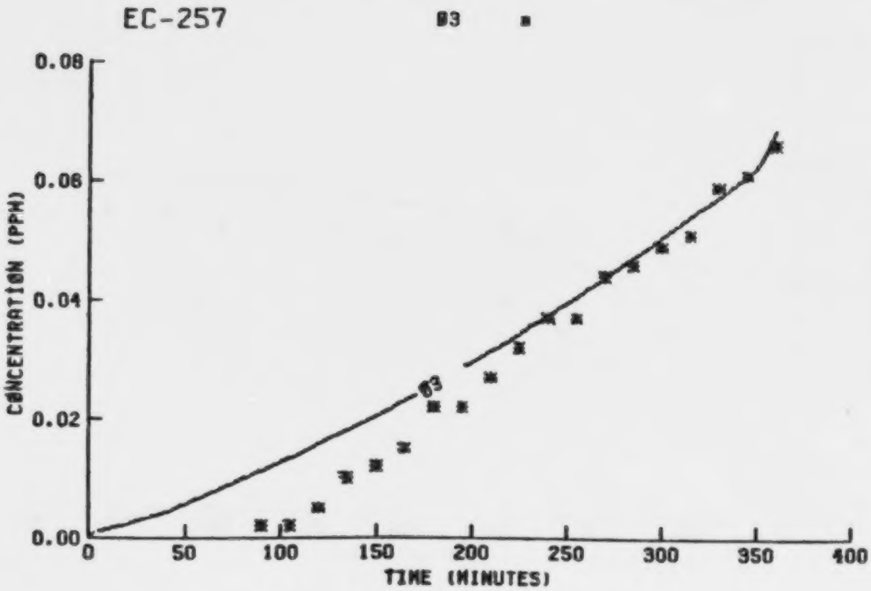

EC-256
NO2 +
NO ×
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
NO
NO2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

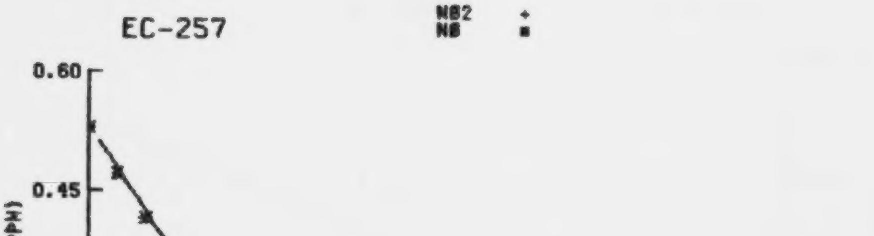

EC-256
FORM +
PROP ×
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
FORM
PROP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

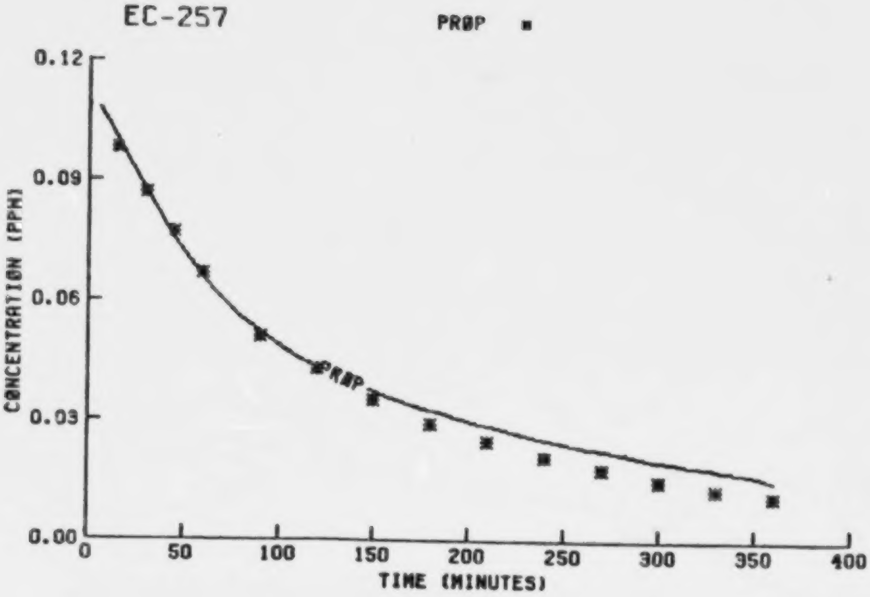

EC-256
PAN ×
0.0012
0.0009
0.0006
0.0003
0.0000
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

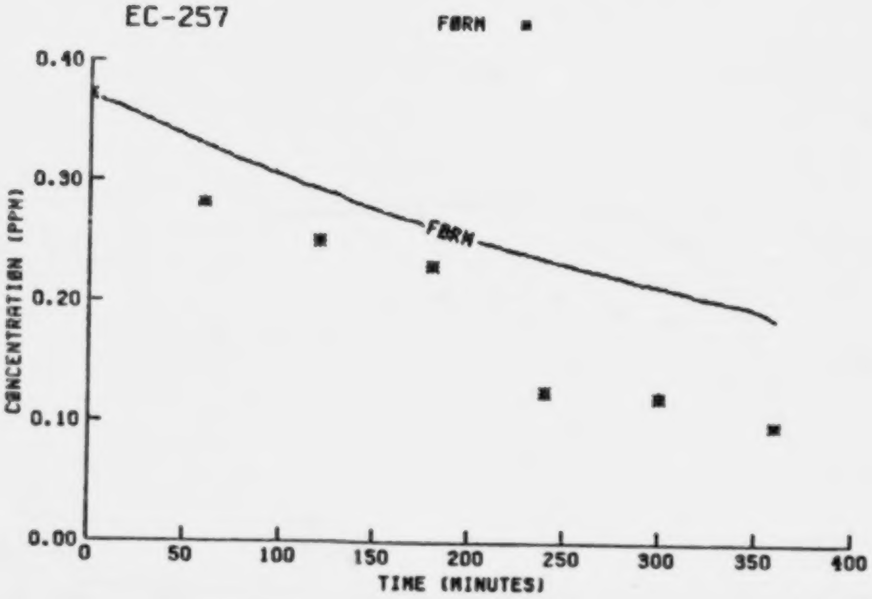

EC-256
ALD2 ✱
0.060
0.045
0.030
0.015
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2

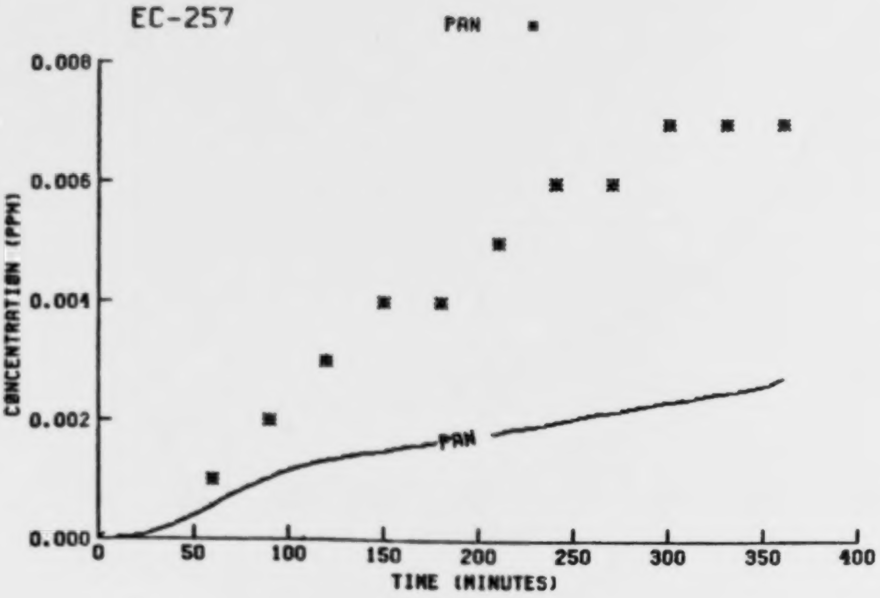

EC-256
ALD3 ✱
0.0008
0.0006
0.0004
0.0002
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3

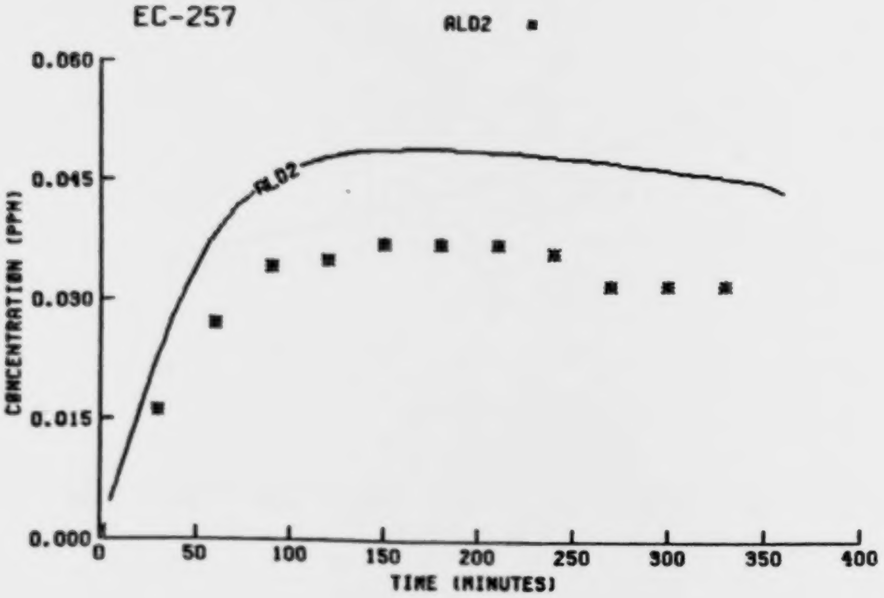

EC-257
O3
CONCENTRATION (PPM)
0.00
0.02
0.04
0.06
0.08
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

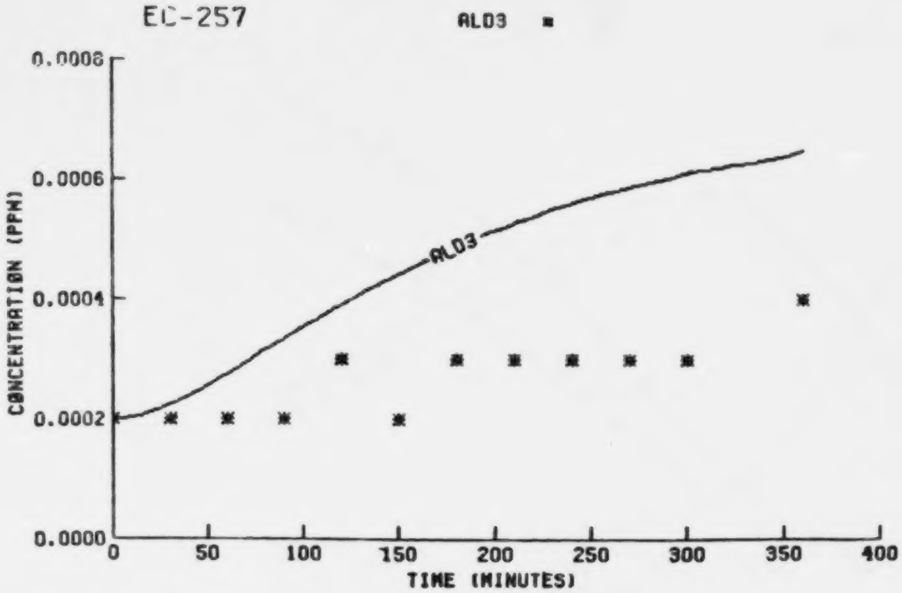

EC-257
NO2 +
NO
CONCENTRATION (PPM)
0.00
0.15
0.30
0.45
0.60
NO2
NO
TIME (MINUTES)
0
50
100
150
200
250
300
350
400


EC-257
PROP ✱
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
PROP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-257
FORM ✱
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

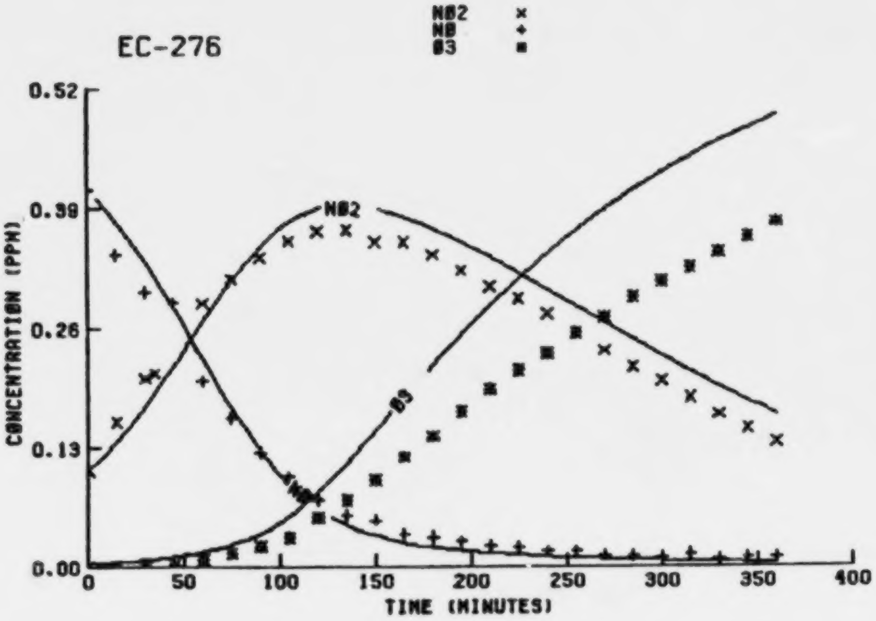

EC-257
PAN ■
0.008
0.006
0.004
0.002
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

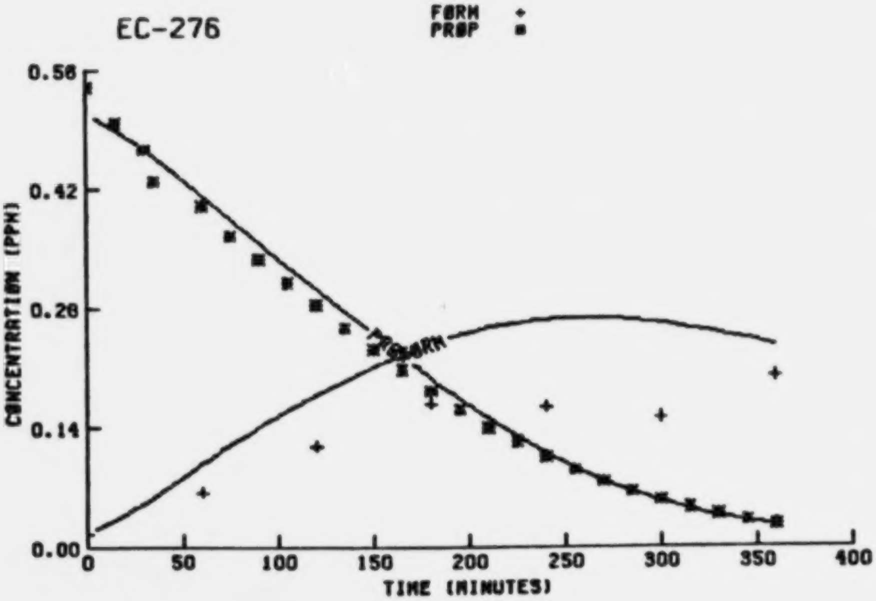

EC-257
ALD2 ■
0.060
0.045
0.030
0.015
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2

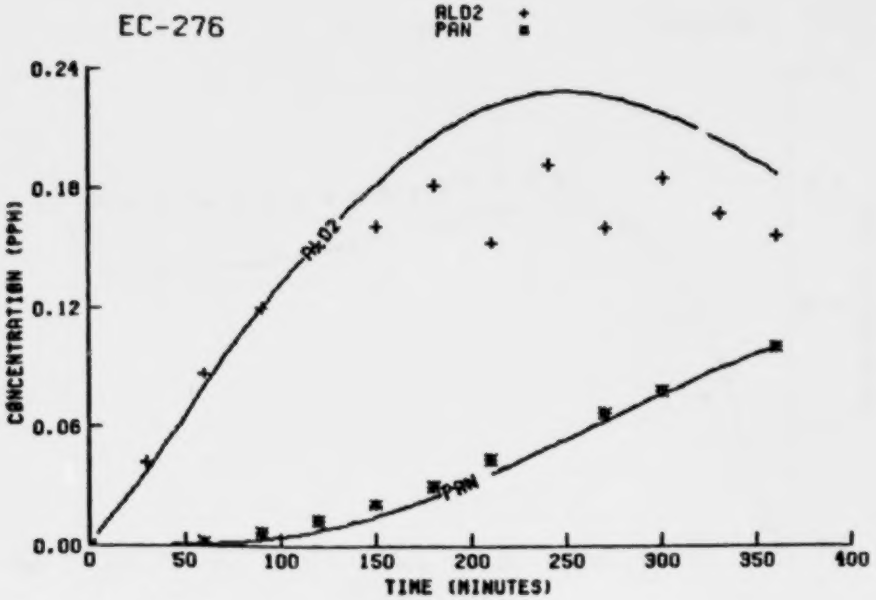


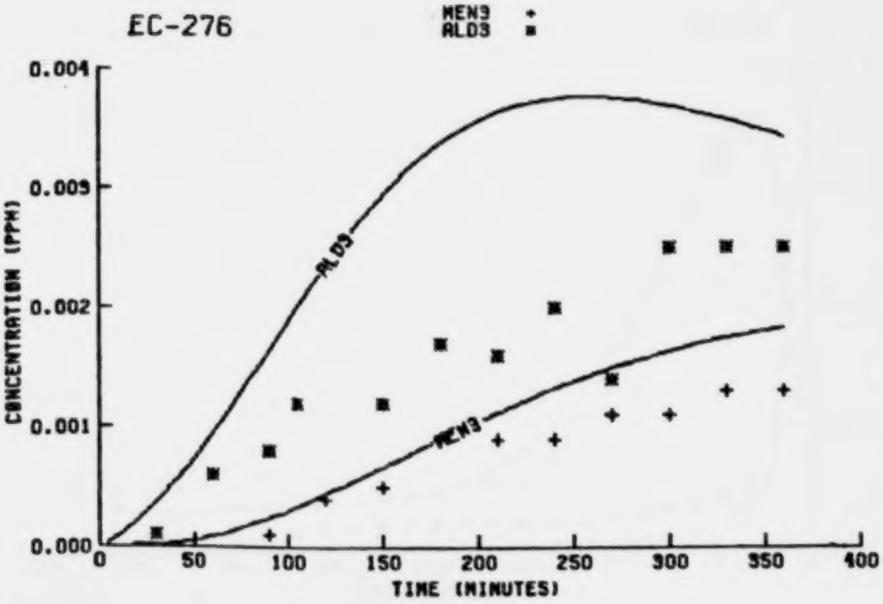
EC-257

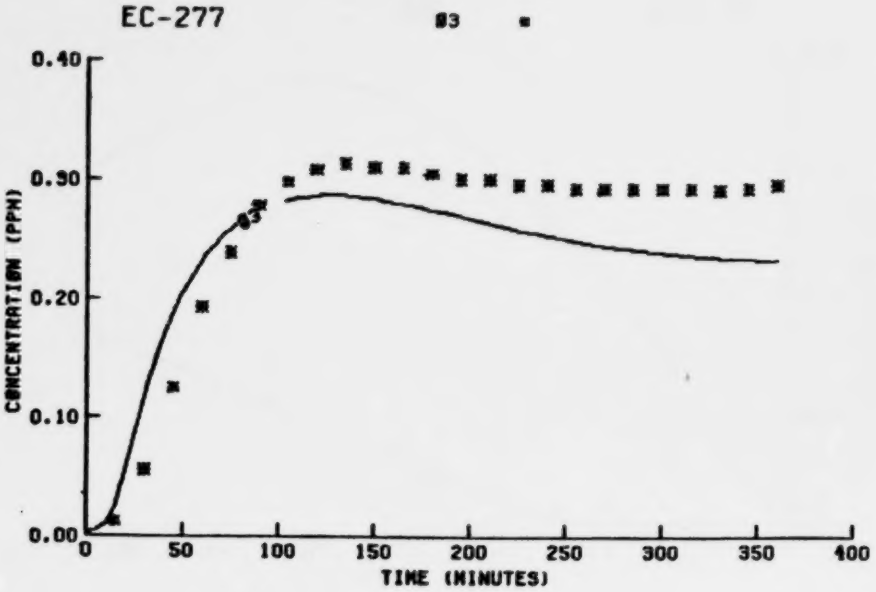
ALD3 *
CONCENTRATION (PPM)
0.0008
0.0006
0.0004
0.0002
0.0000
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

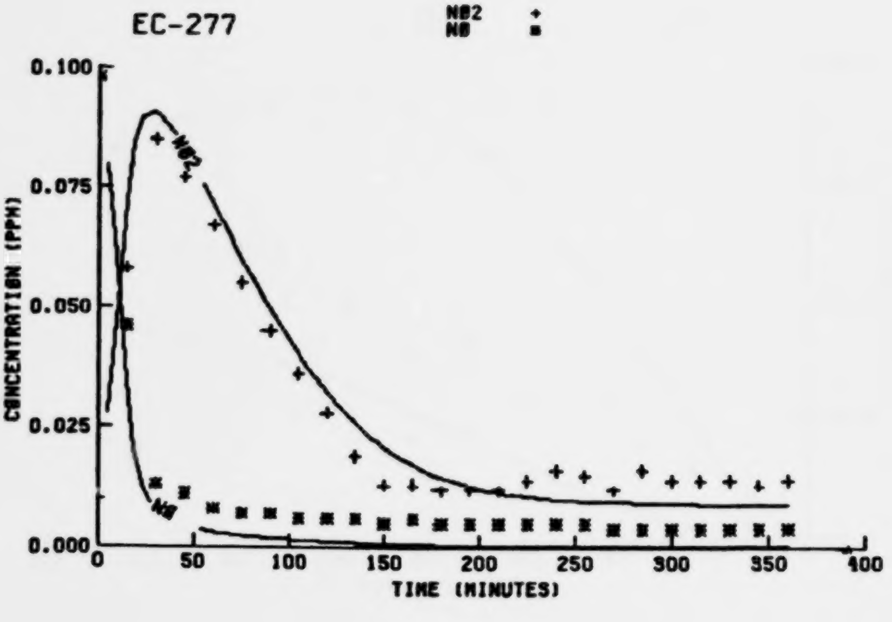

EC-276
NØ2 ×
NØ +
Ø3 ■
CONCENTRATIØN (PPM)
0.00
0.13
0.26
0.39
0.52
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
NØ2
NØ
Ø3

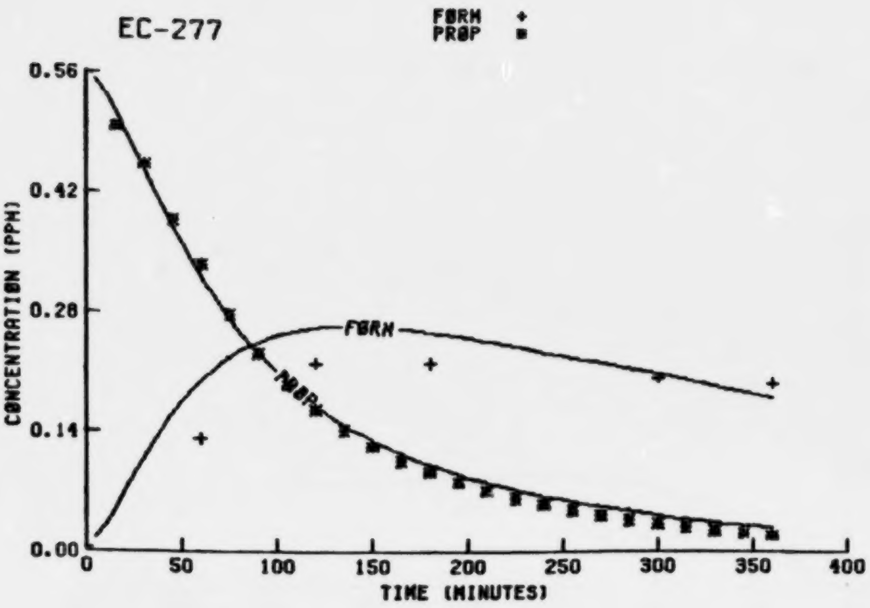

EC-276
FØRM +
PRØP ■
CONCENTRATIØN (PPM)
0.00
0.14
0.28
0.42
0.56
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
PRØP
FØRM

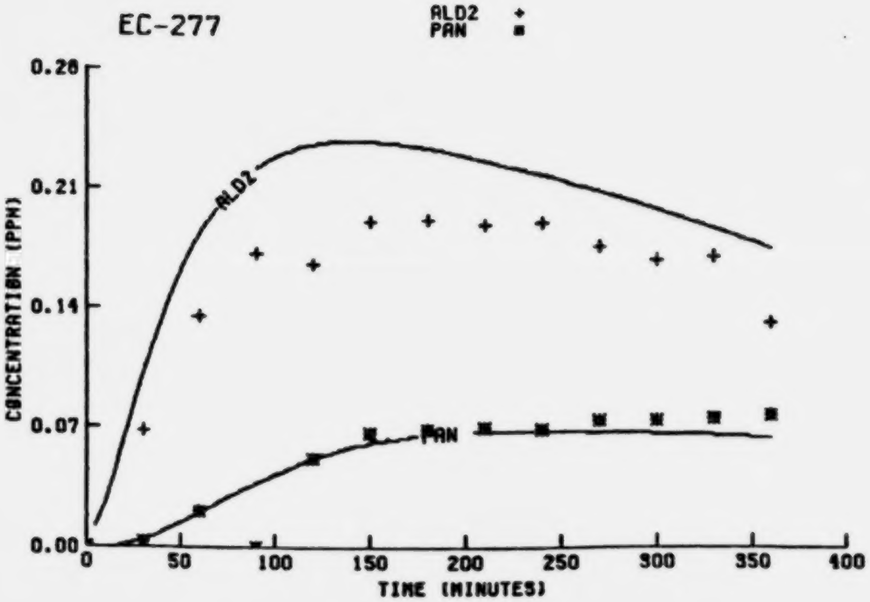

EC-276
ALD2 +
PAN ▪
ALD2
PAN
CONCENTRATION (PPM)
0.00
0.06
0.12
0.18
0.24
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

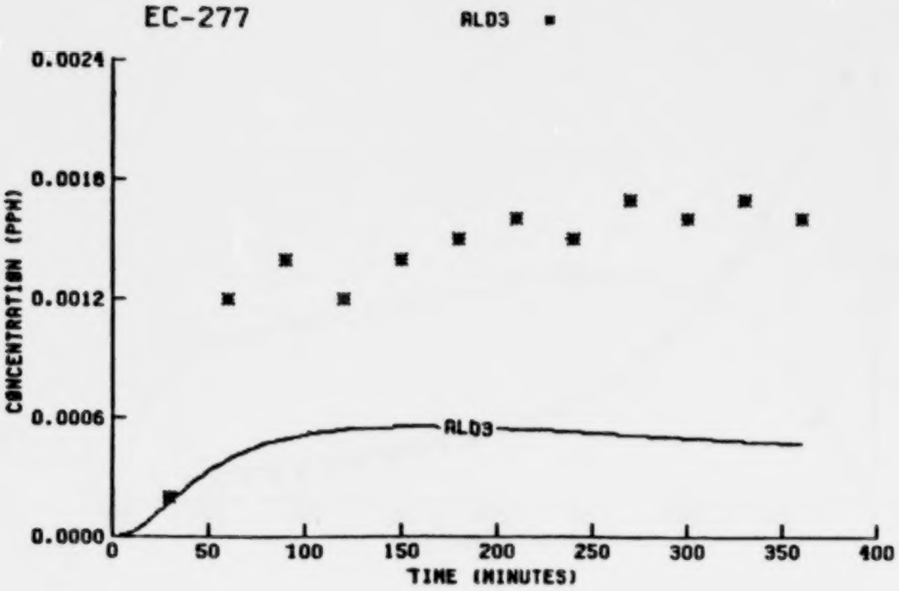

EC-276
MEN3 +
ALD3 ▪
ALD3
MEN3
CONCENTRATION (PPM)
0.000
0.001
0.002
0.003
0.004
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

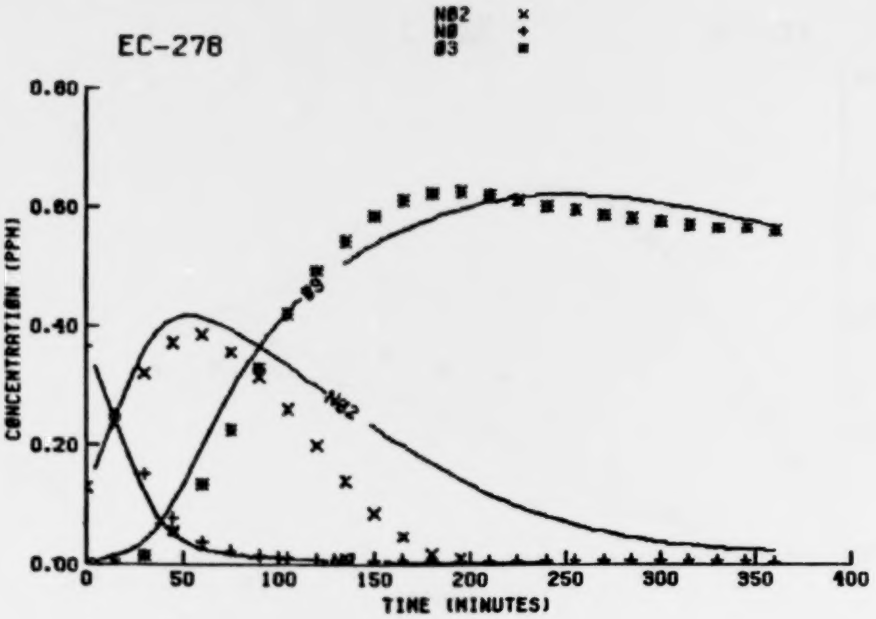

EC-277
O3 ✱
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

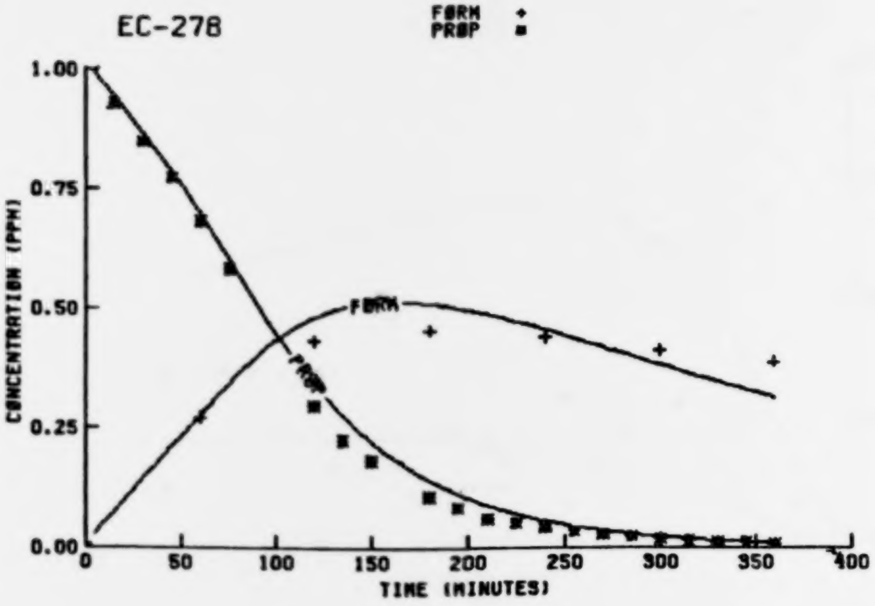

EC-277
NO2 +
NO ✱
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

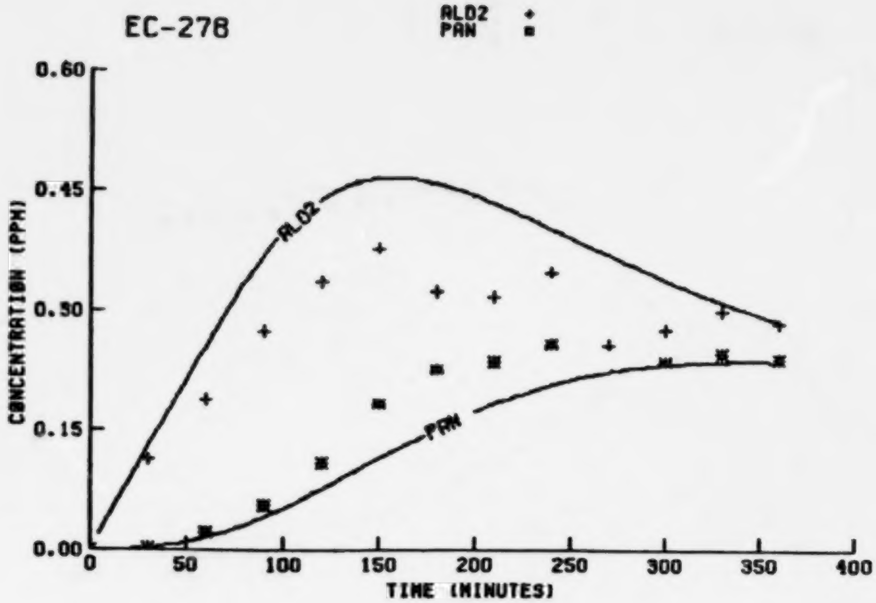

EC-277
FORM +
PROP ■
0.56
0.42
0.28
0.14
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PROP

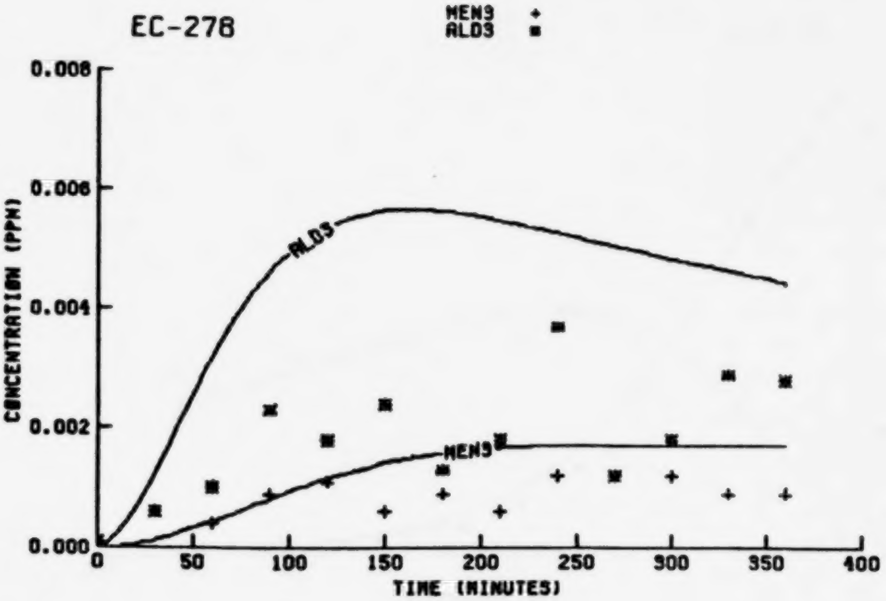

EC-277
ALD2 +
PAN ■
0.28
0.21
0.14
0.07
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

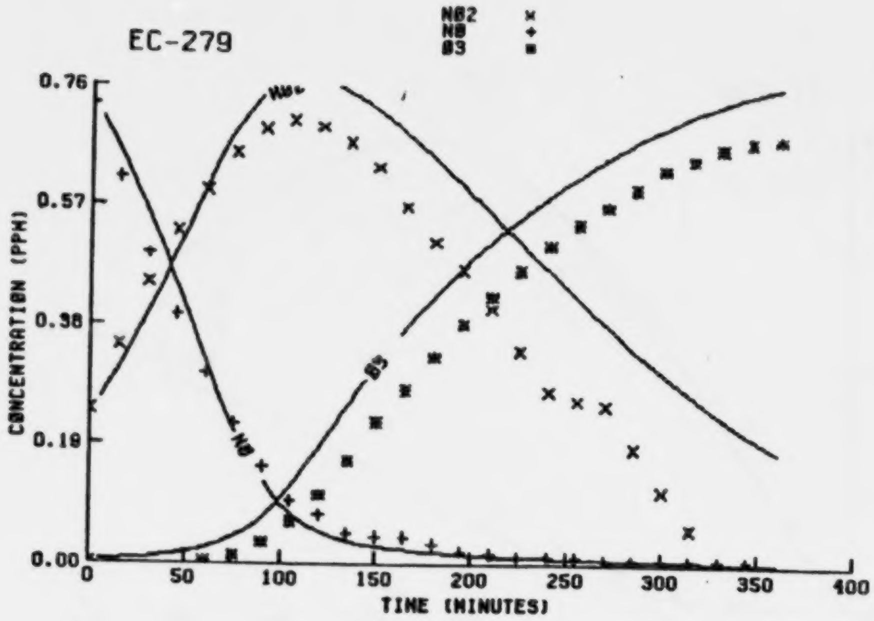

EC-277
ALD3 ▪
0.0024
0.0018
0.0012
0.0006
0.0000
CONCENTRATION (PPM)
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

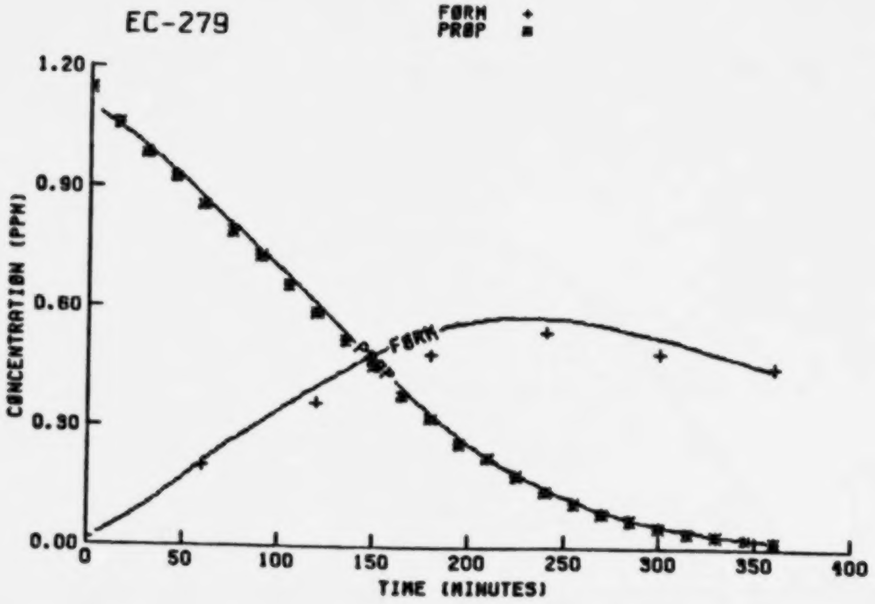

EC-278
NO2 ×
NO +
O3 ▪
CONCENTRATION (PPM)
0.80
0.60
0.40
0.20
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3
NO2

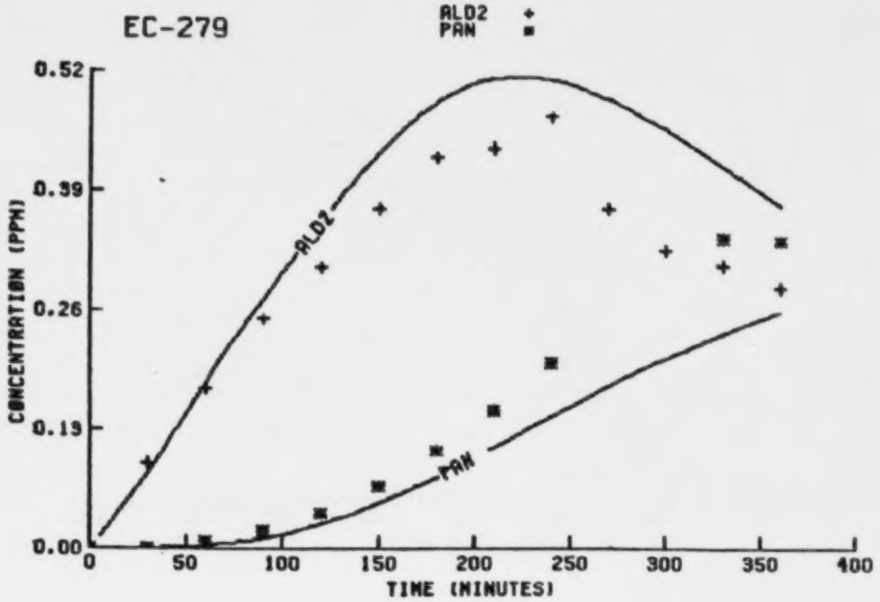

EC-278
FORM +
PROP ▪
CONCENTRATION (PPM)
1.00
0.75
0.50
0.25
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PROP

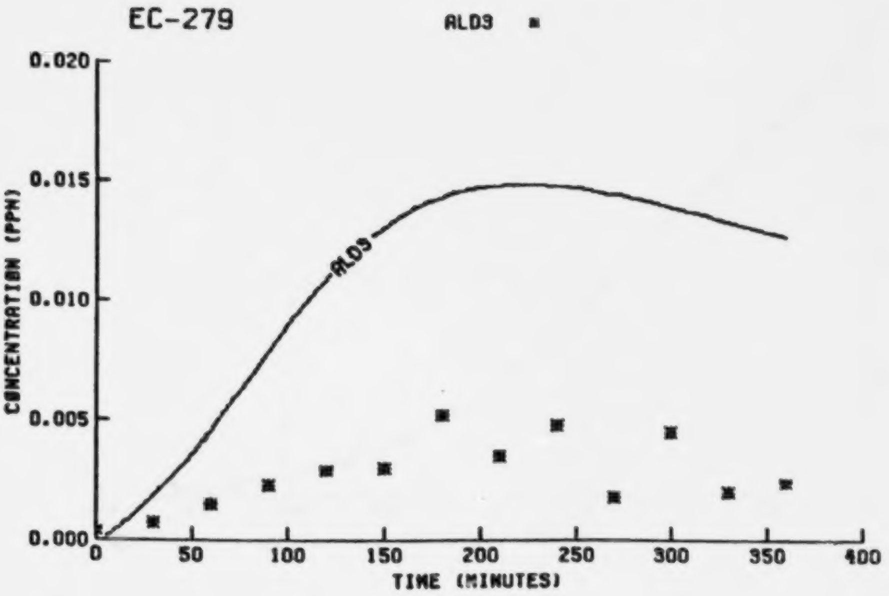

EC-278
ALD2 +
PAN ■
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
ALD2
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

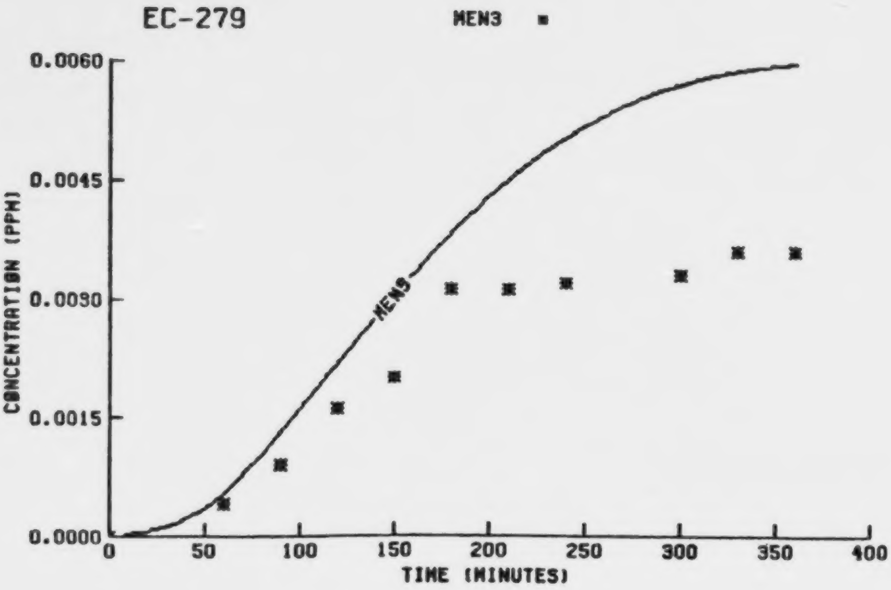

EC-278
MEN3 +
ALD3 ■
0.008
0.006
0.004
0.002
0.000
CONCENTRATION (PPM)
ALD3
MEN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-279
NØ2 ×
NØ +
Ø3 ■
CONCENTRATION (PPM)
0.76
0.57
0.38
0.19
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
NØ2
NØ
Ø3

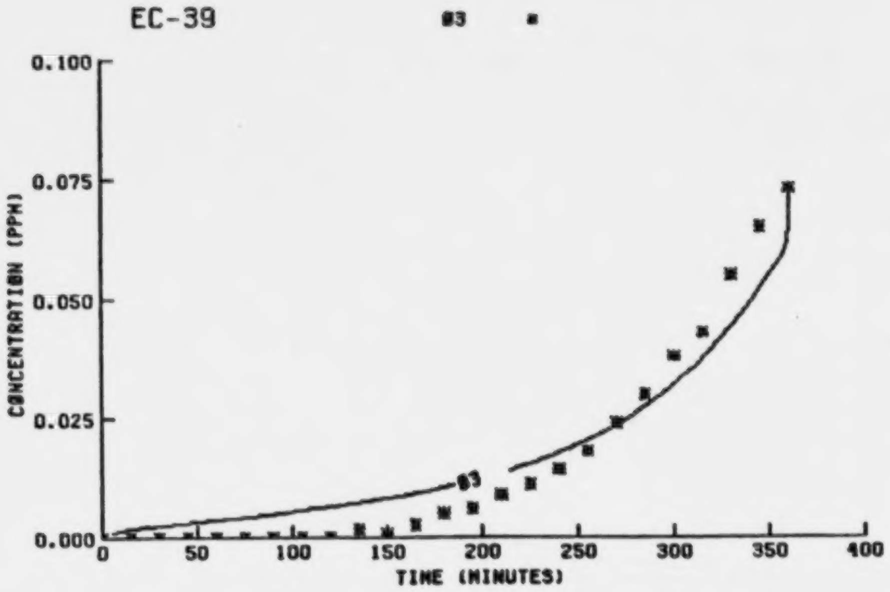

EC-279
FØRM +
PRØP ■
CONCENTRATION (PPM)
1.20
0.90
0.60
0.30
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
FØRM
PRØP

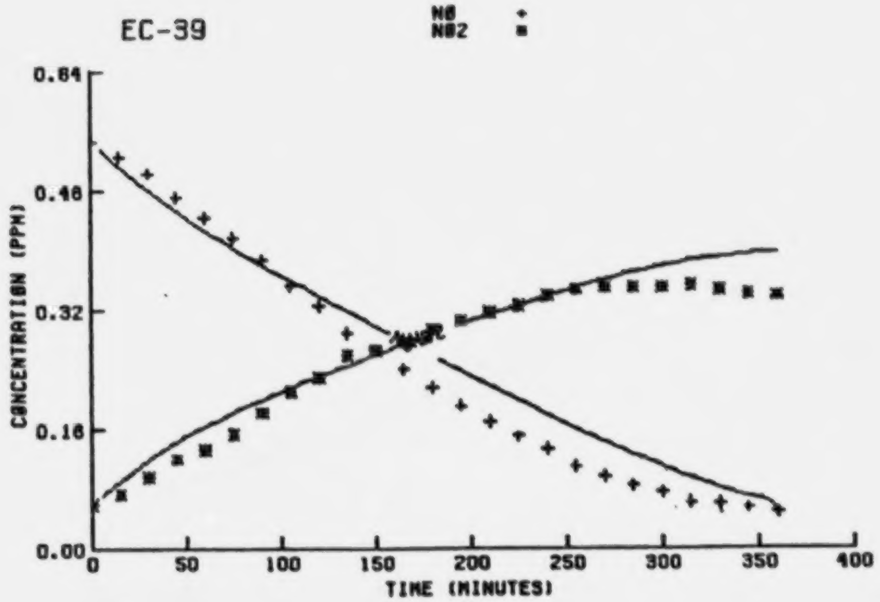

EC-279
ALD2 +
PAN ■
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

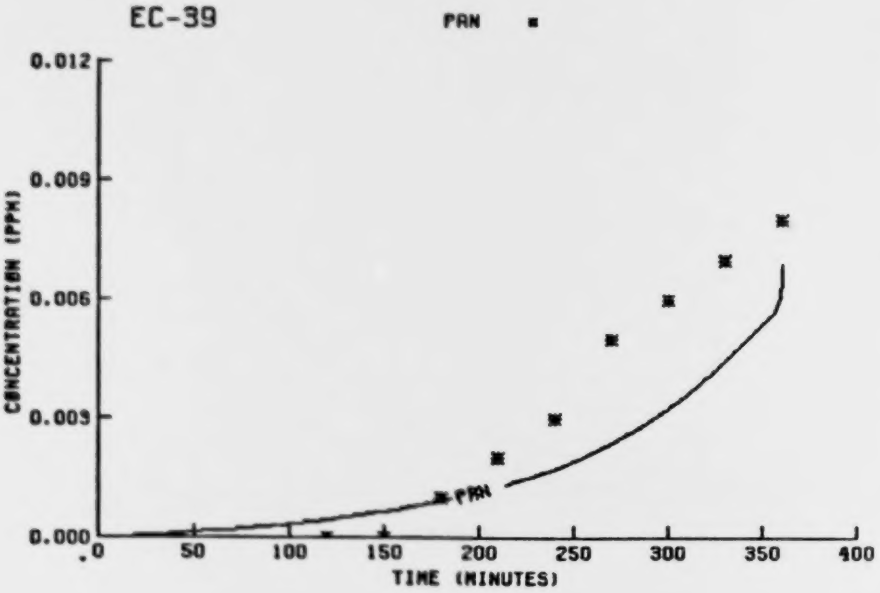

EC-279
ALD3 ■
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3

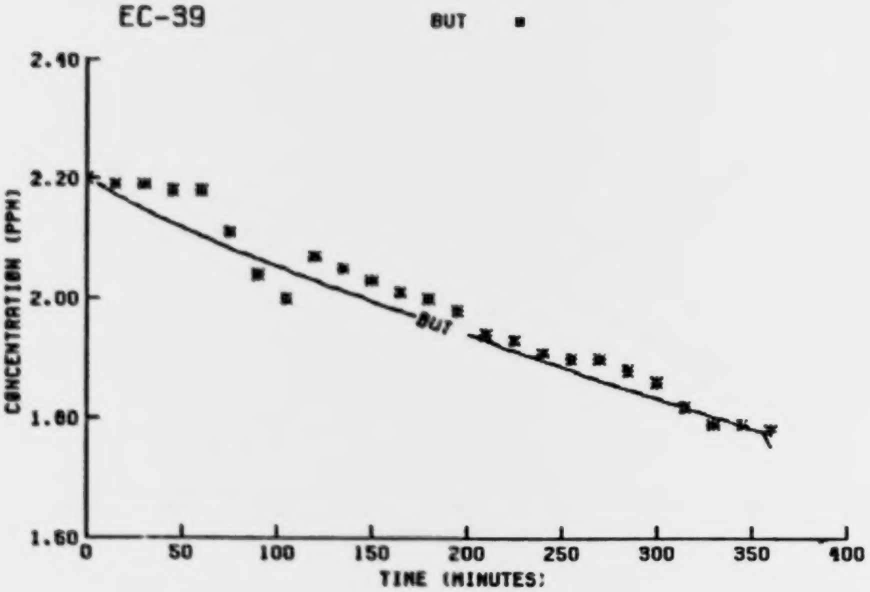

EC-279
MEN3
CONCENTRATION (PPM)
0.0060
0.0045
0.0030
0.0015
0.0000
MEN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

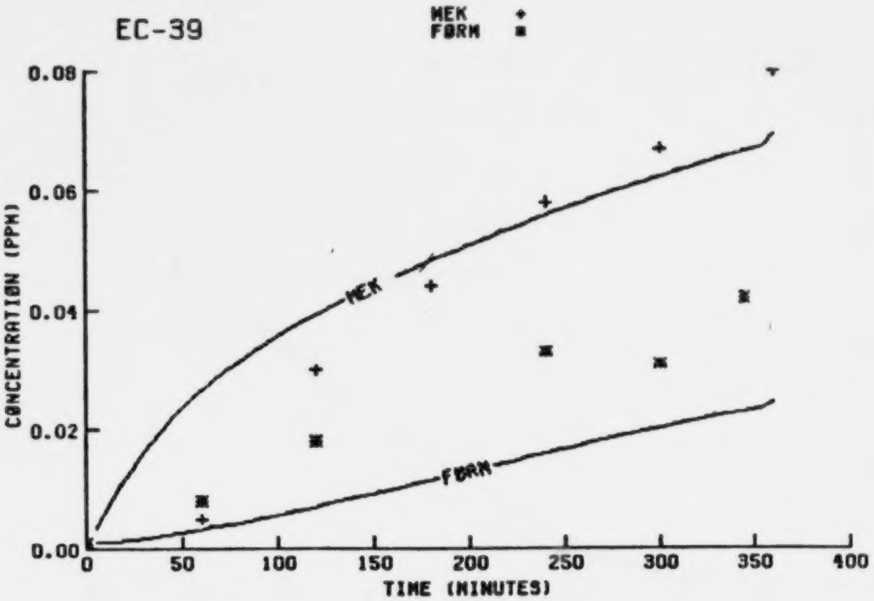
UCR BUTANE EXPERIMENTS

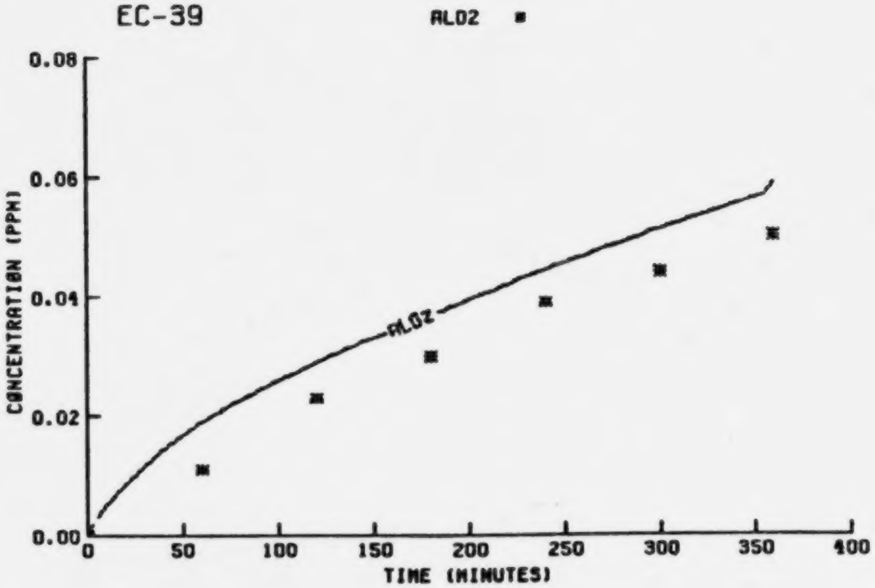

EC-39
O3 ✱
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3

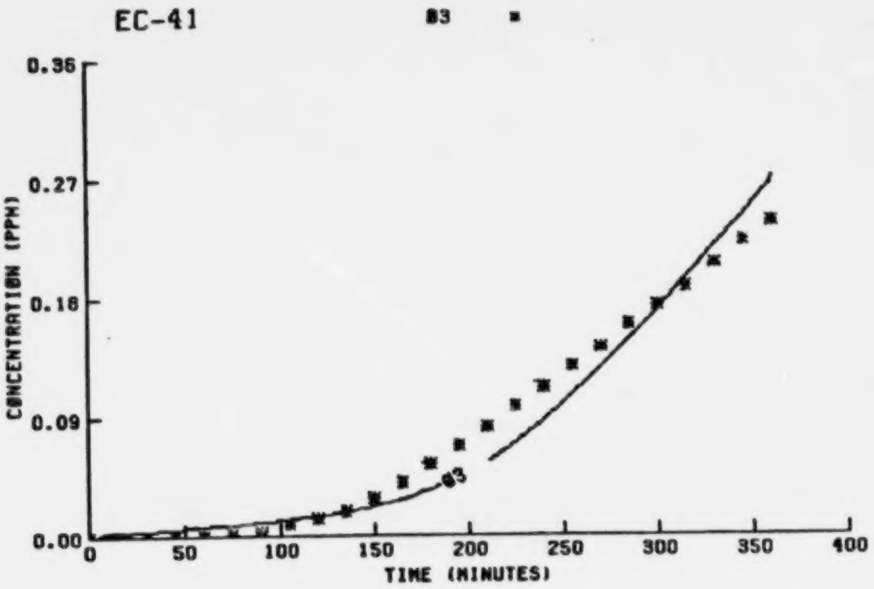

EC-39
NO +
NO2 ✱
0.64
0.48
0.32
0.16
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

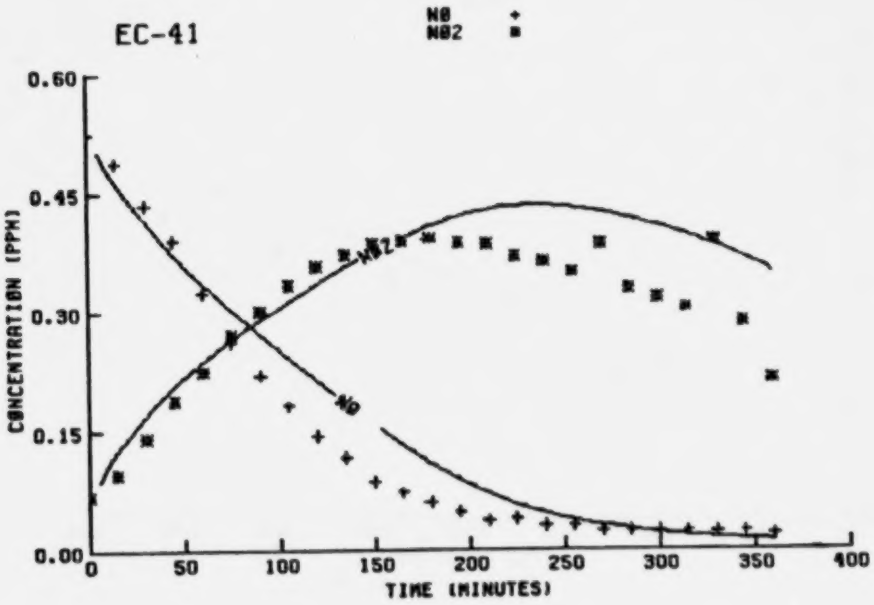

EC-39
PAN
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

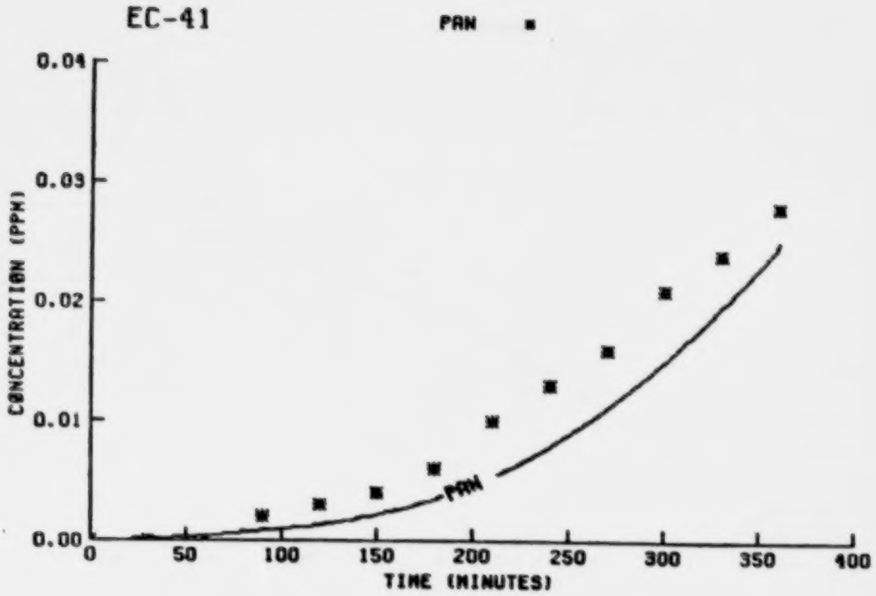

EC-39
BUT
2.40
2.20
2.00
1.80
1.60
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

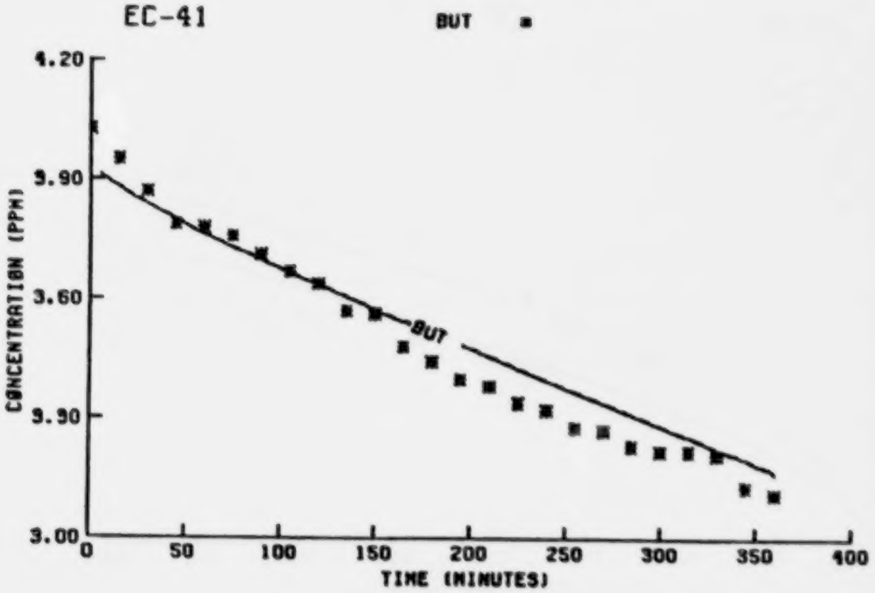

EC-39
MEK +
FØRM ✱
0.08
0.06
0.04
0.02
0.00
CØNCENTRATIØN (PPM)
MEK
FØRM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

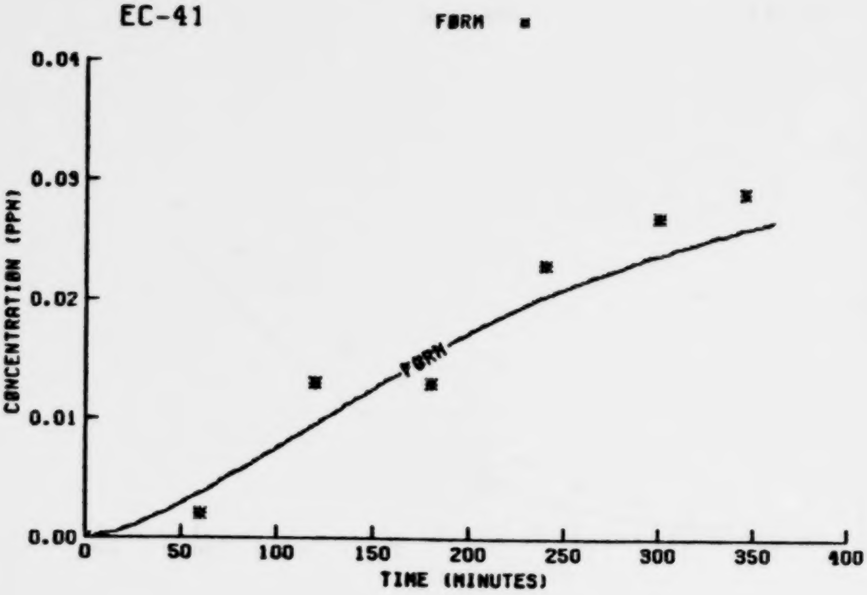

EC-39
ALD2 ✱
0.08
0.06
0.04
0.02
0.00
CØNCENTRATIØN (PPM)
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

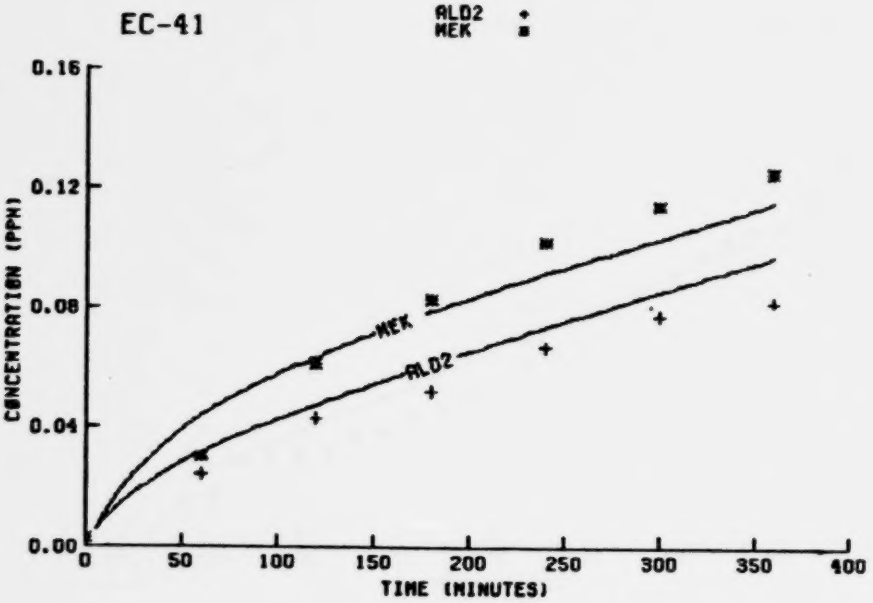

EC-41
O3
0.36
0.27
0.18
0.09
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

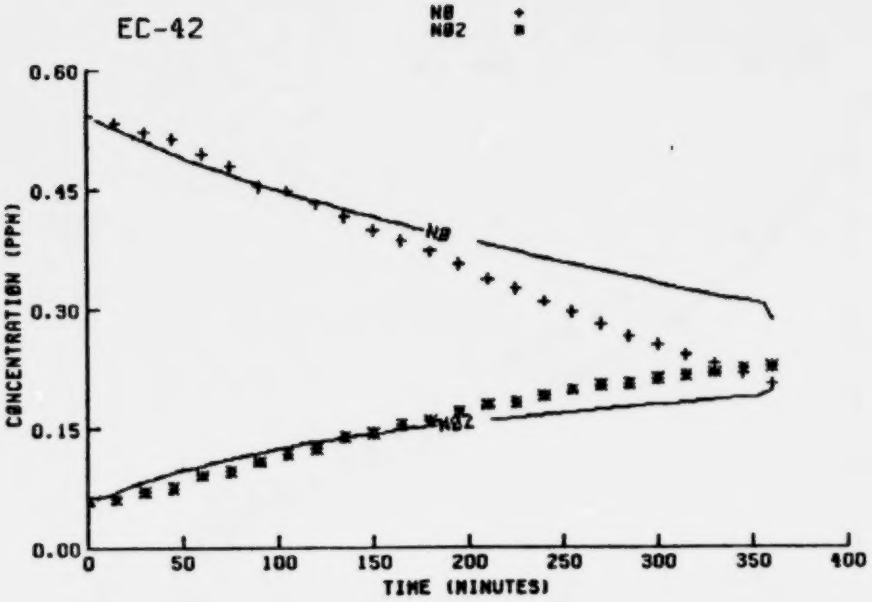

EC-41
NO +
NO2
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

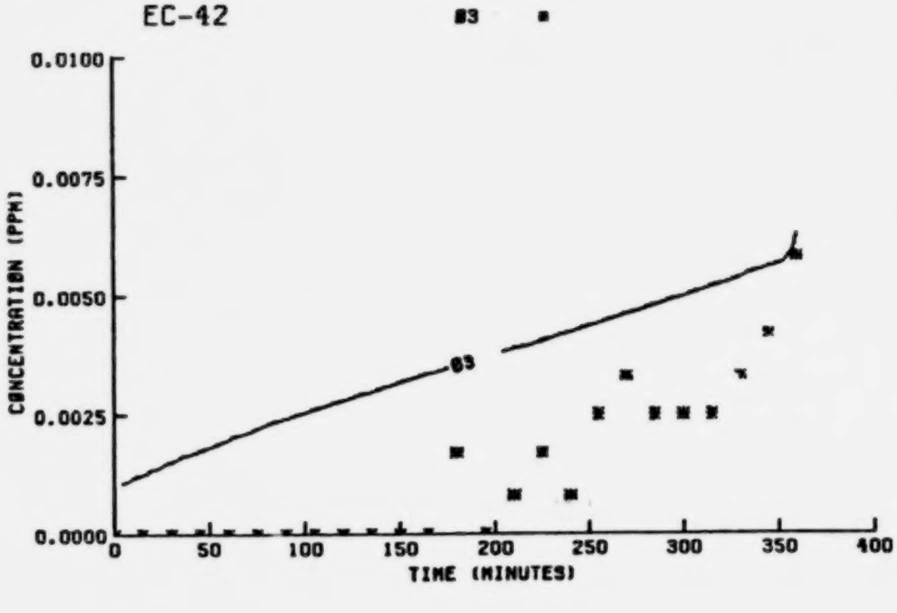

EC-41
PAN ■
CONCENTRATION (PPM)
0.04
0.03
0.02
0.01
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

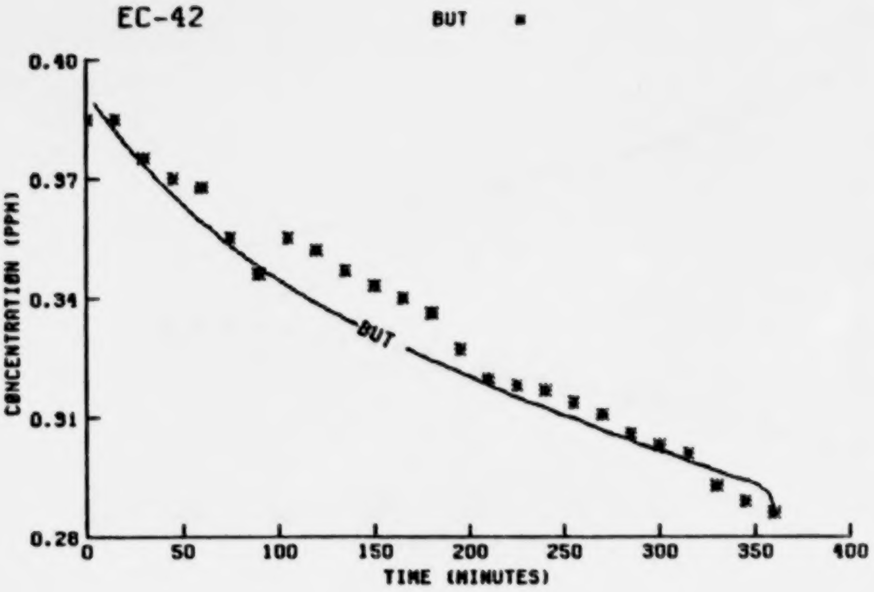

EC-41
BUT ■
CONCENTRATION (PPM)
4.20
3.90
3.60
3.30
3.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

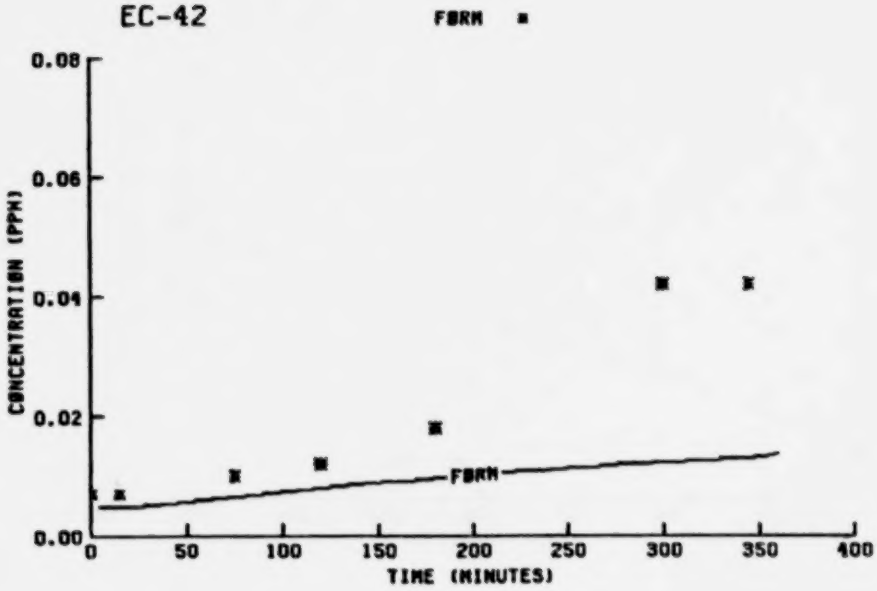

EC-41
FØRM ■
0.04
0.03
0.02
0.01
0.00
CONCENTRATIØN (PPM)
FØRM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

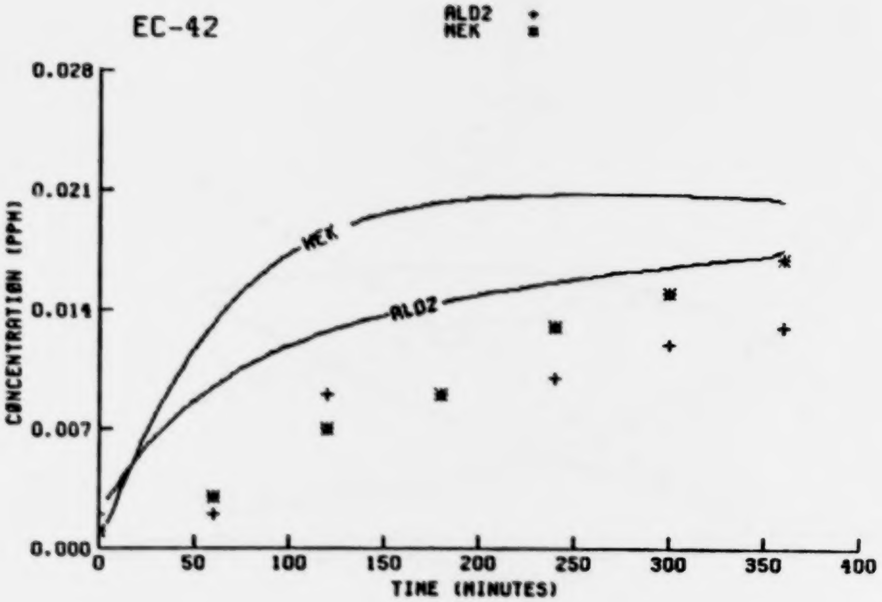

EC-41
ALD2 +
MEK ■
0.16
0.12
0.08
0.04
0.00
CONCENTRATIØN (PPM)
MEK
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

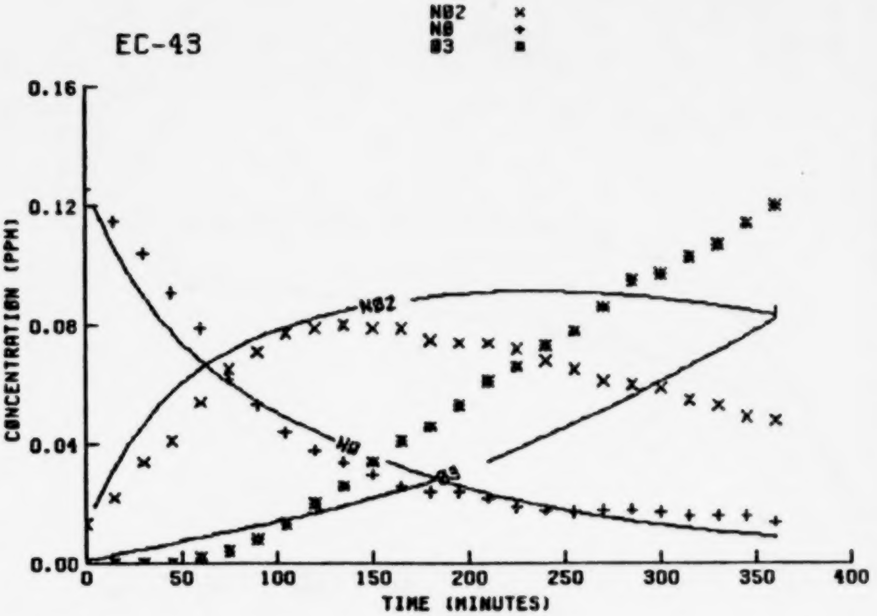

EC-42
NO +
NO2 *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
NO
NO2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

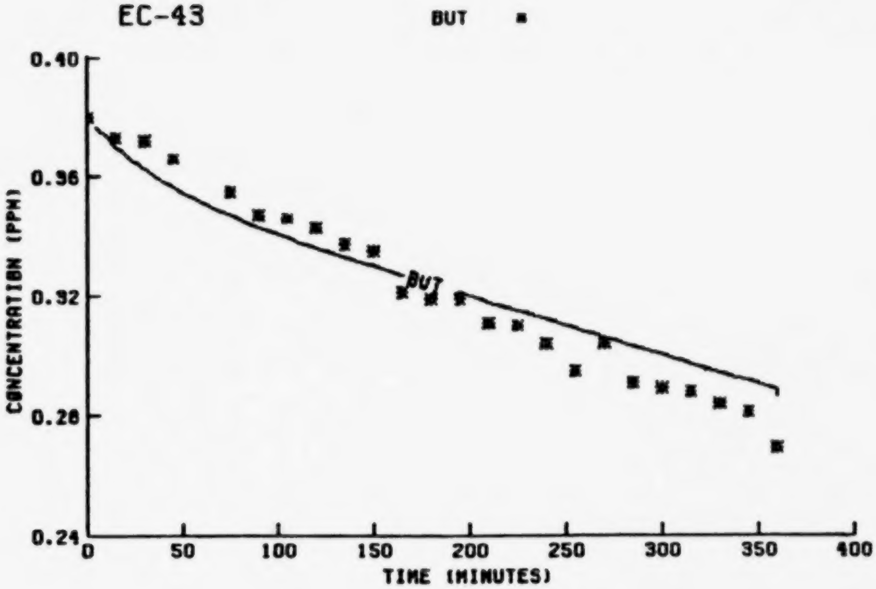

EC-42
O3 *
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

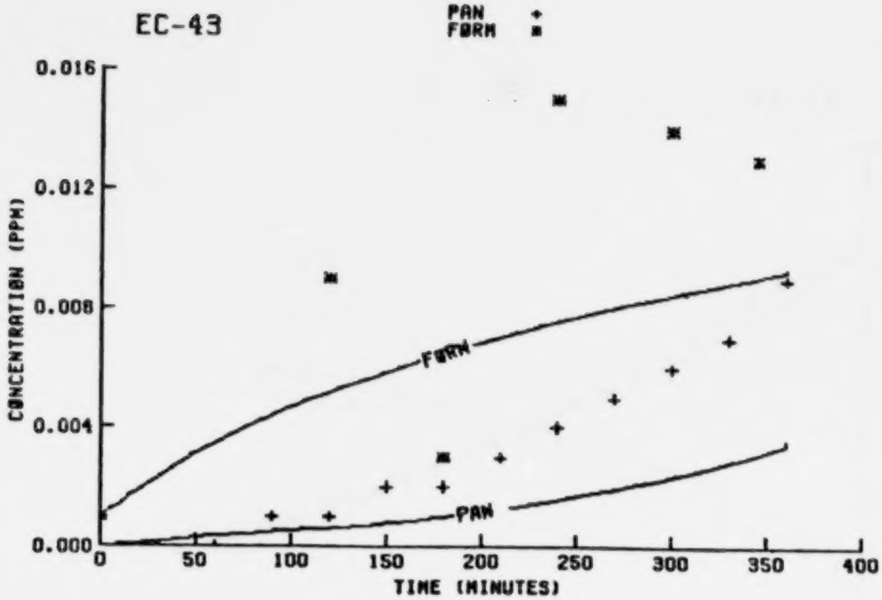

EC-42
BUT
CONCENTRATION (PPM)
0.40
0.37
0.34
0.31
0.28
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

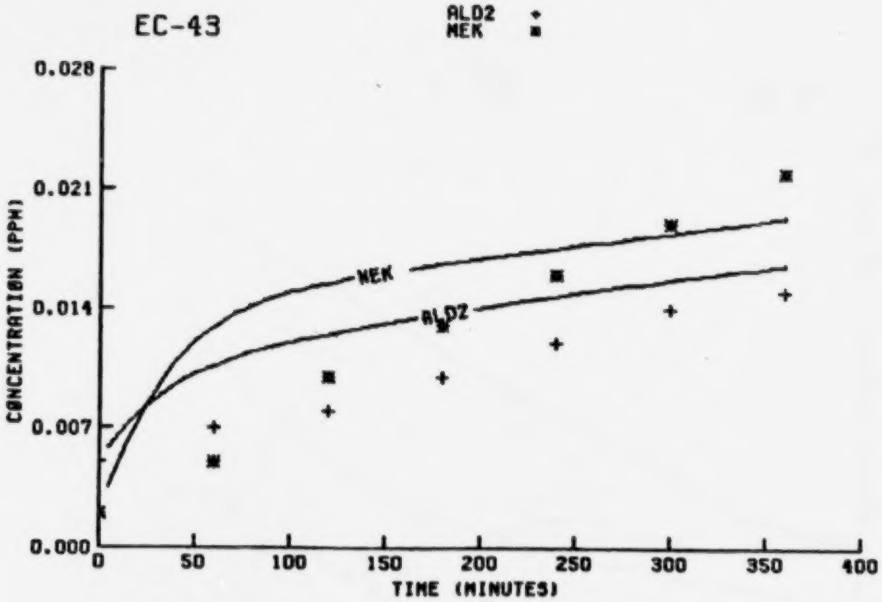

EC-42
FORM
CONCENTRATION (PPM)
0.08
0.06
0.04
0.02
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

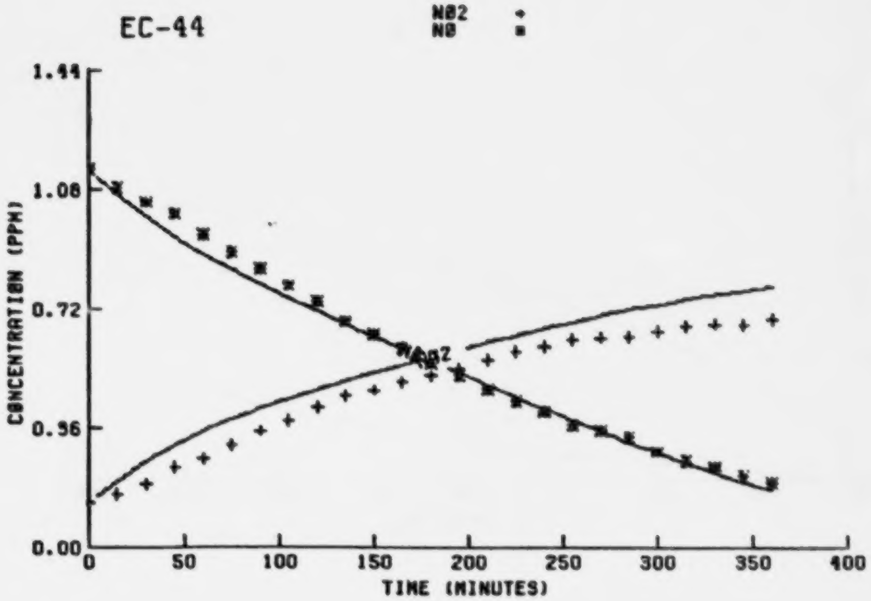

EC-42
ALD2 +
MEK ✱
0.028
0.021
0.014
0.007
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEK
ALD2

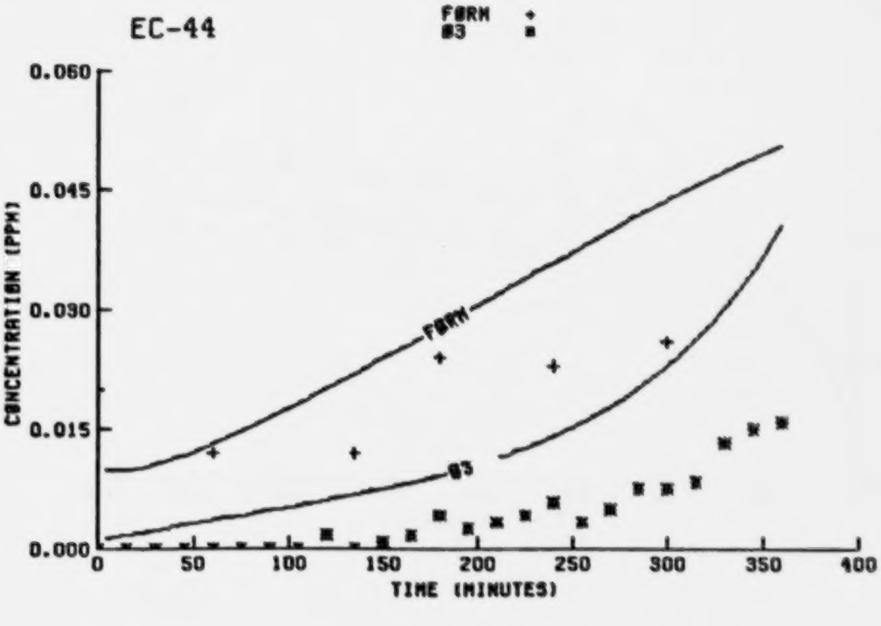

EC-43
NO2 ×
NO +
O3 ■
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
NO2
NO
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

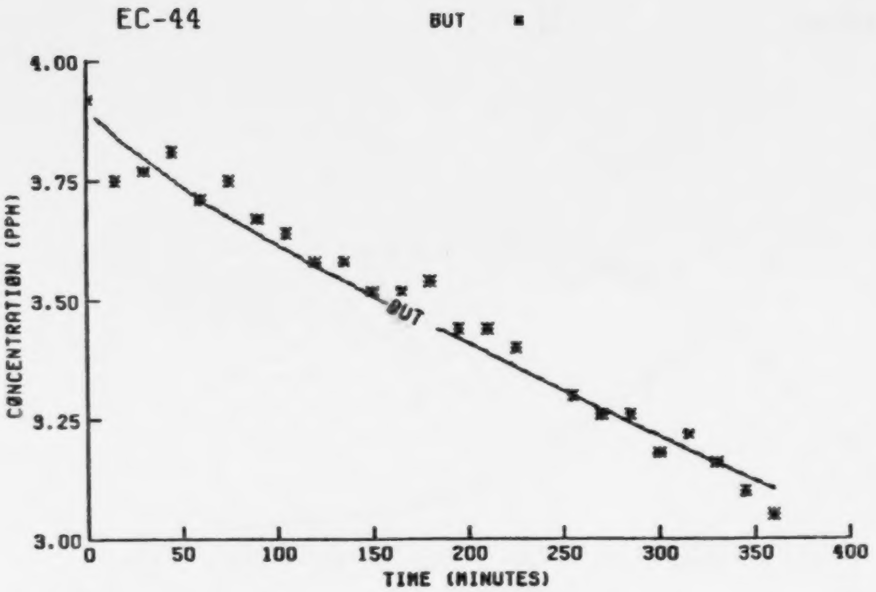

EC-43
BUT ■
0.40
0.36
0.32
0.28
0.24
CONCENTRATION (PPM)
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

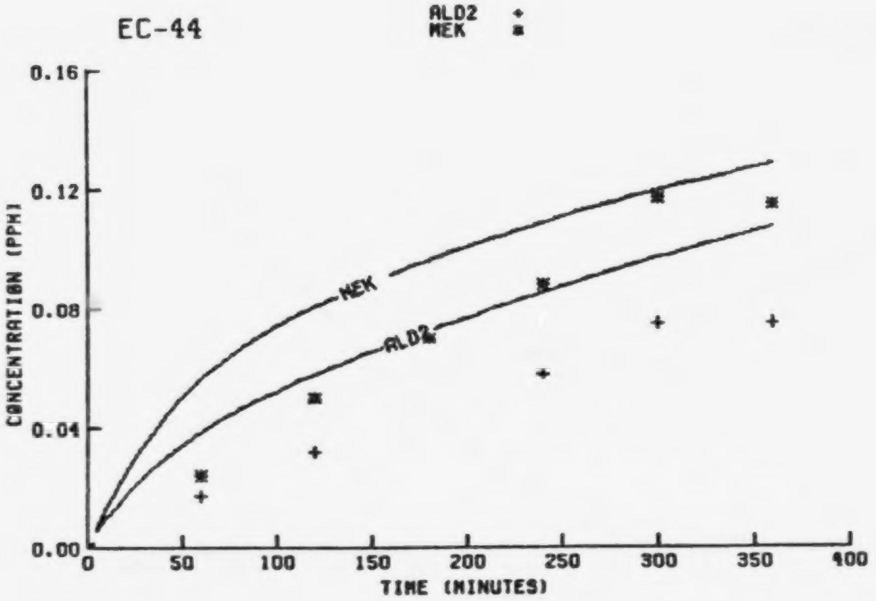

EC-43
PAN +
FØRM ж
0.016
0.012
0.008
0.004
0.000
CØNCENTRATIØN (PPM)
FØRM
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

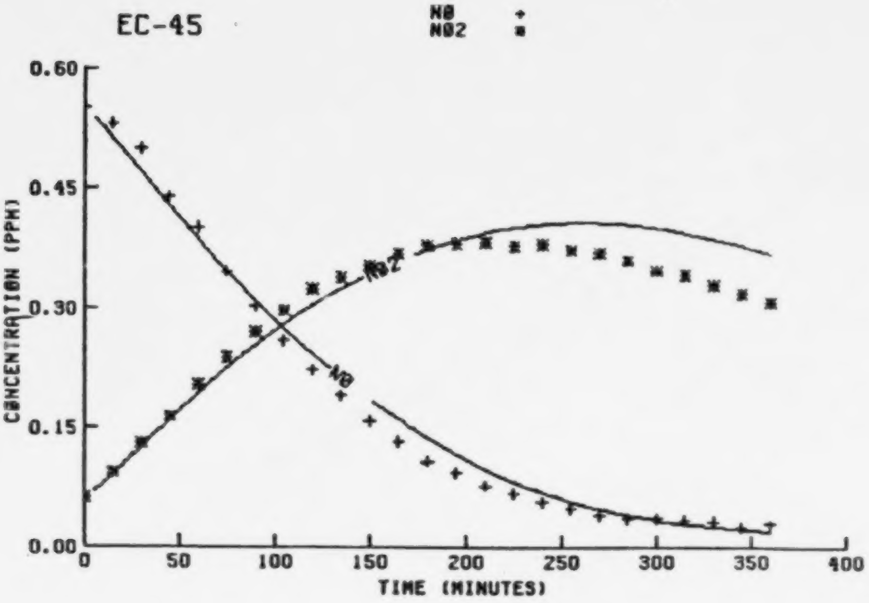

EC-43
ALD2 +
MEK ж
0.028
0.021
0.014
0.007
0.000
CØNCENTRATIØN (PPM)
MEK
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

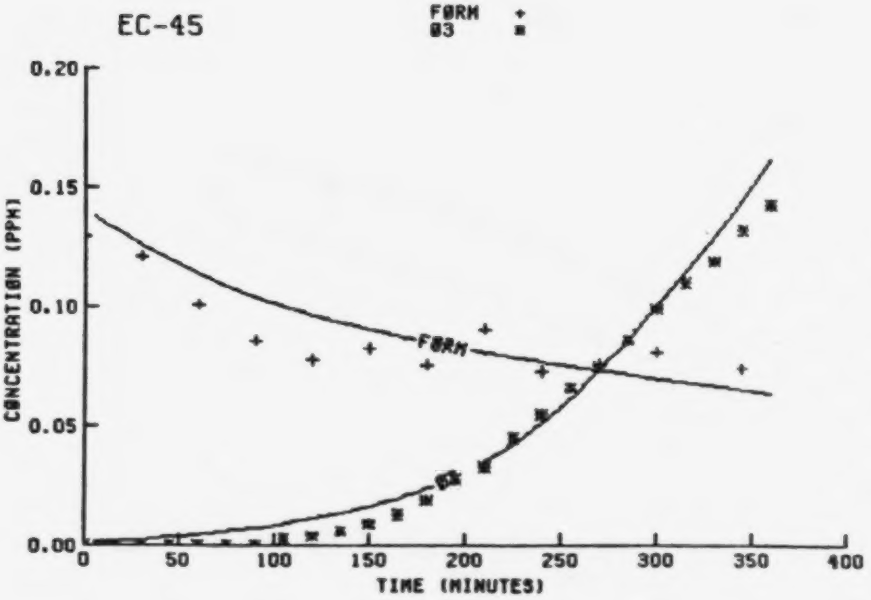

EC-44
NO2 +
NO ■
1.44
1.08
0.72
0.36
0.00
CONCENTRATION (PPM)
NO2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

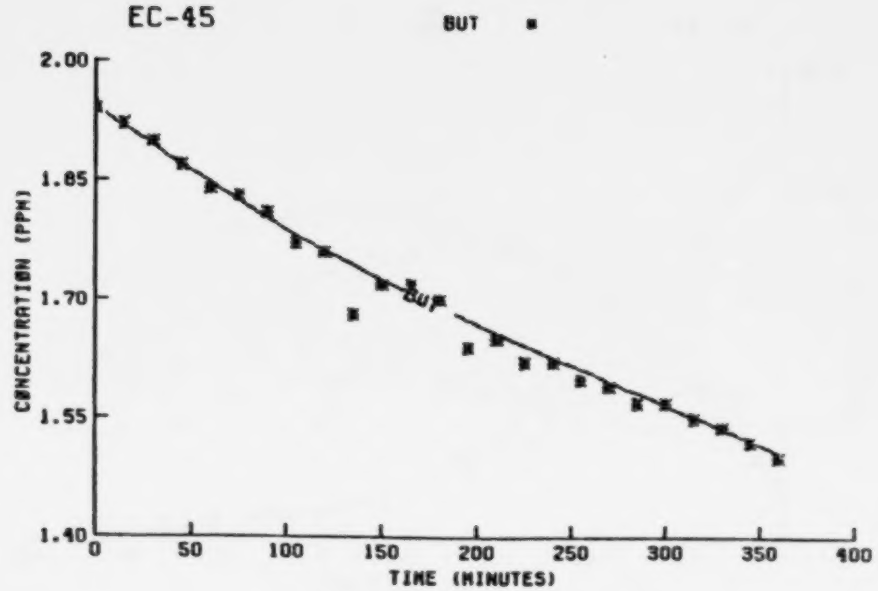

EC-44
FORM +
O3 ■
0.060
0.045
0.030
0.015
0.000
CONCENTRATION (PPM)
FORM
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

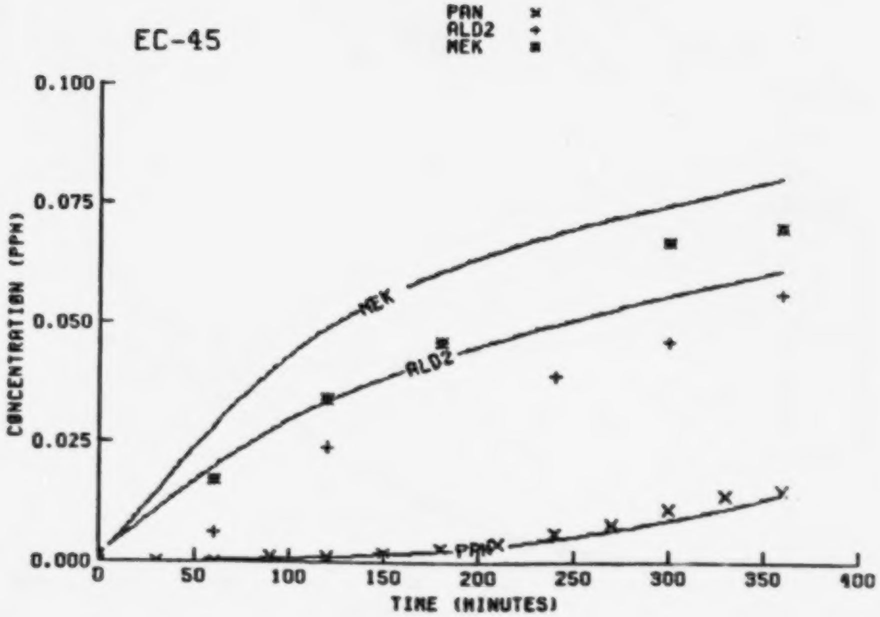

EC-44
BUT
4.00
3.75
3.50
3.25
3.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

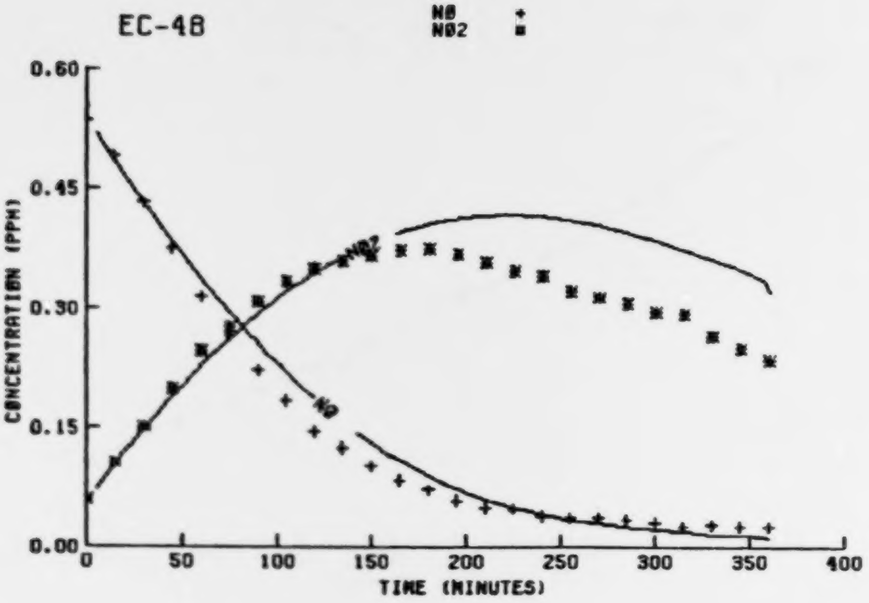

EC-44
ALD2 +
MEK
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEK
ALD2

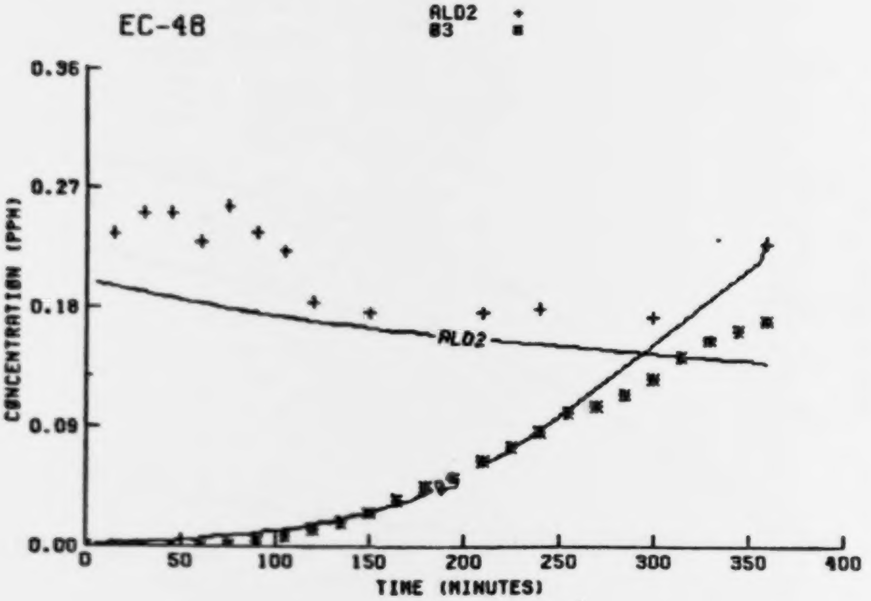

EC-45
NO +
NO2 ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

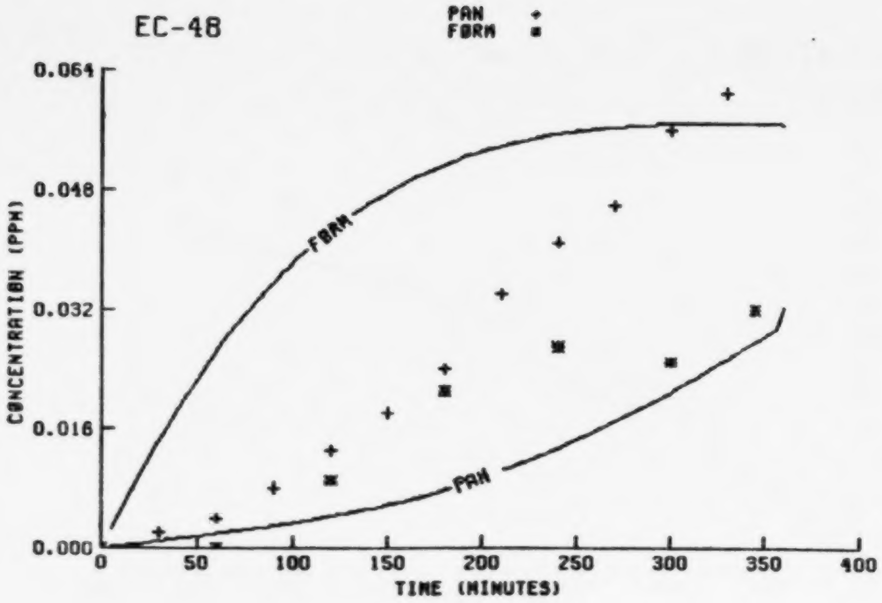

EC-45
FORM +
O3 ✱
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
O3

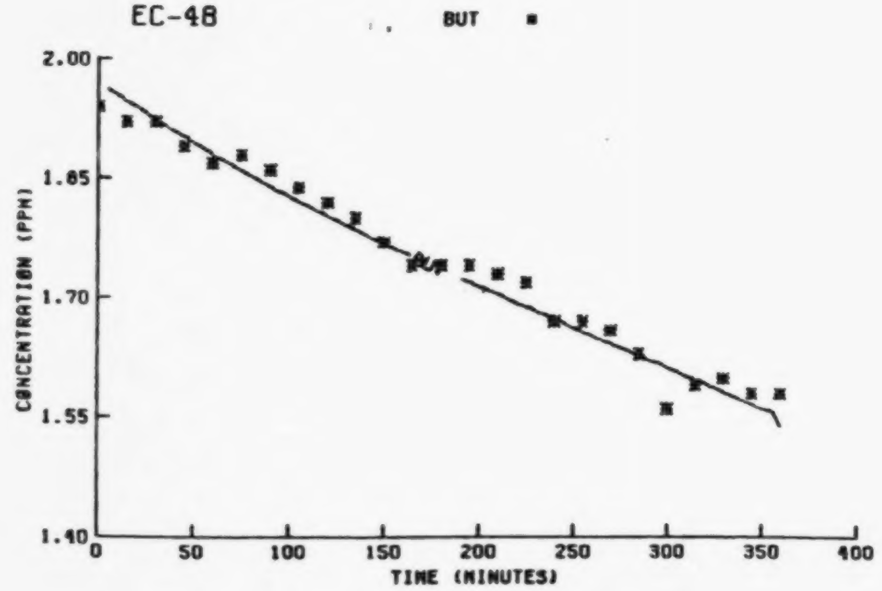

EC-45
BUT
2.00
1.85
1.70
1.55
1.40
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

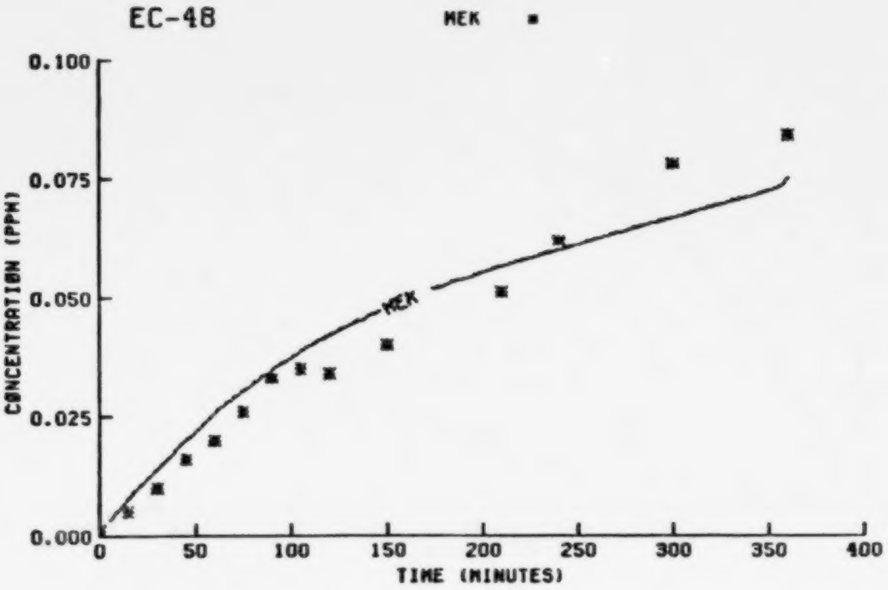

EC-45
PAN ×
ALD2 +
MEK
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEK
ALD2
PAN

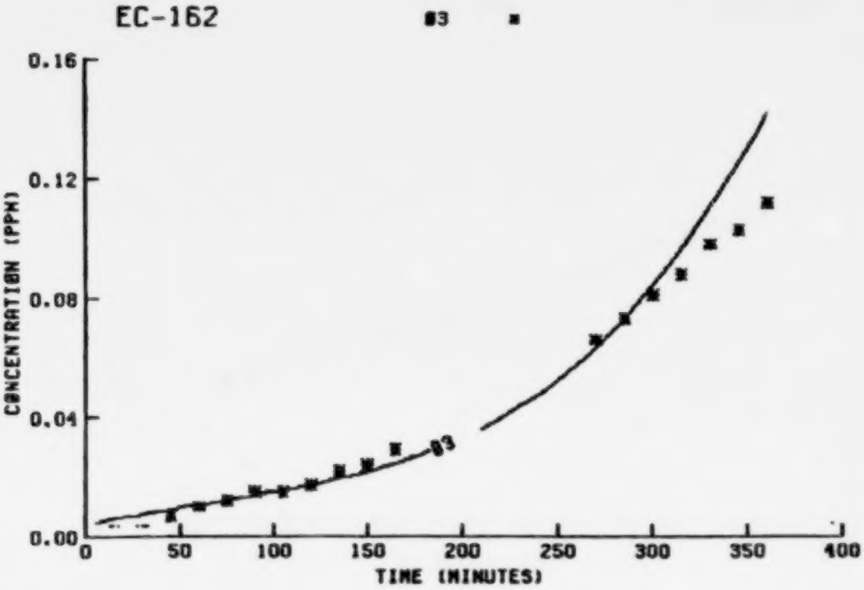

EC-4B
NO +
NO2 *
CONCENTRATION (PPM)
0.60
0.45
0.30
0.15
0.00
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

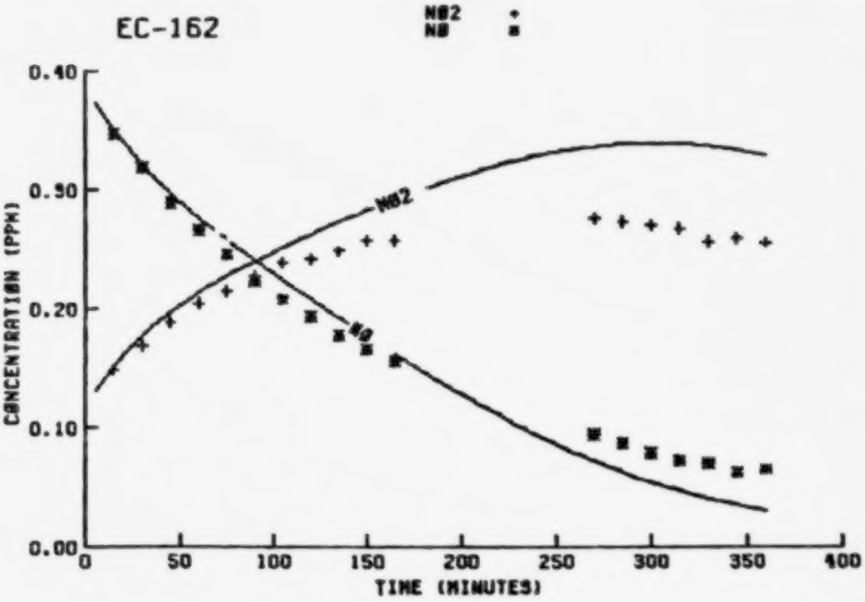

EC-4B
ALD2 +
O3 *
CONCENTRATION (PPM)
0.36
0.27
0.18
0.09
0.00
ALD2
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

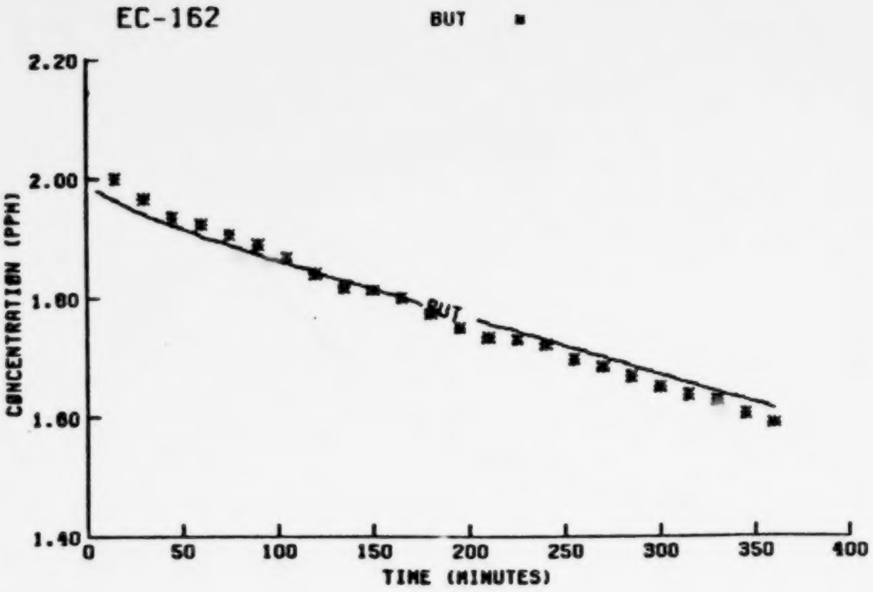

EC-48
PAN +
FORM *
0.064
0.048
0.032
0.016
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PAN

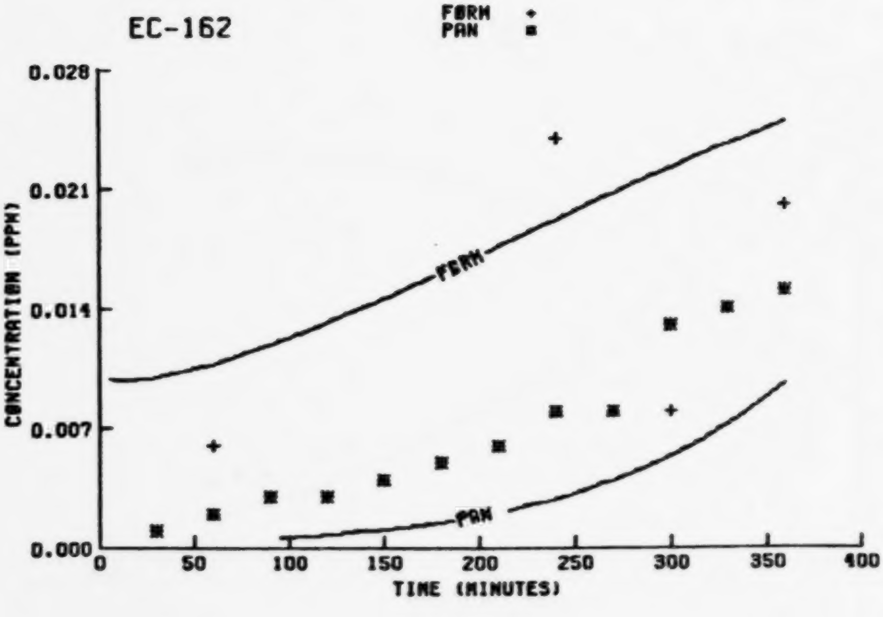

EC-48
BUT *
2.00
1.85
1.70
1.55
1.40
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

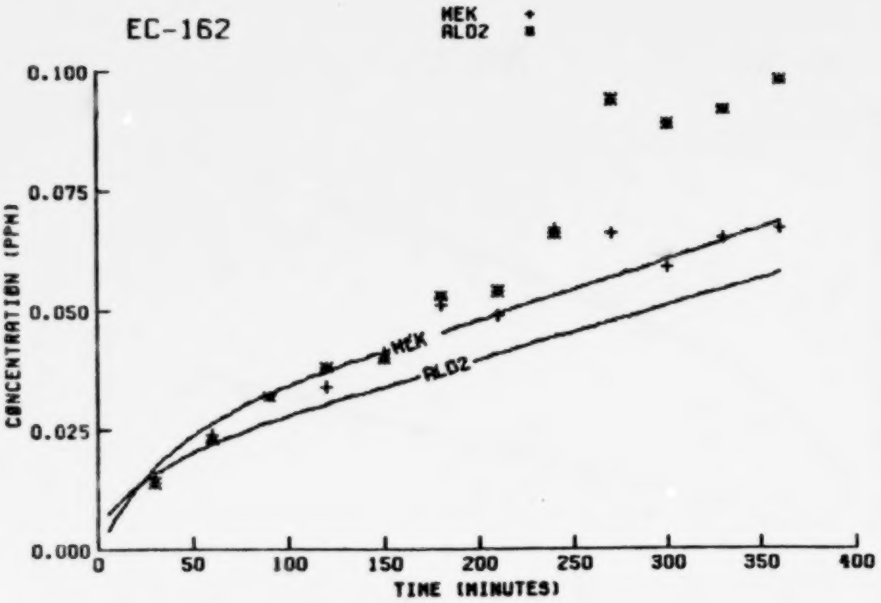

EC-48
MEK ■
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEK

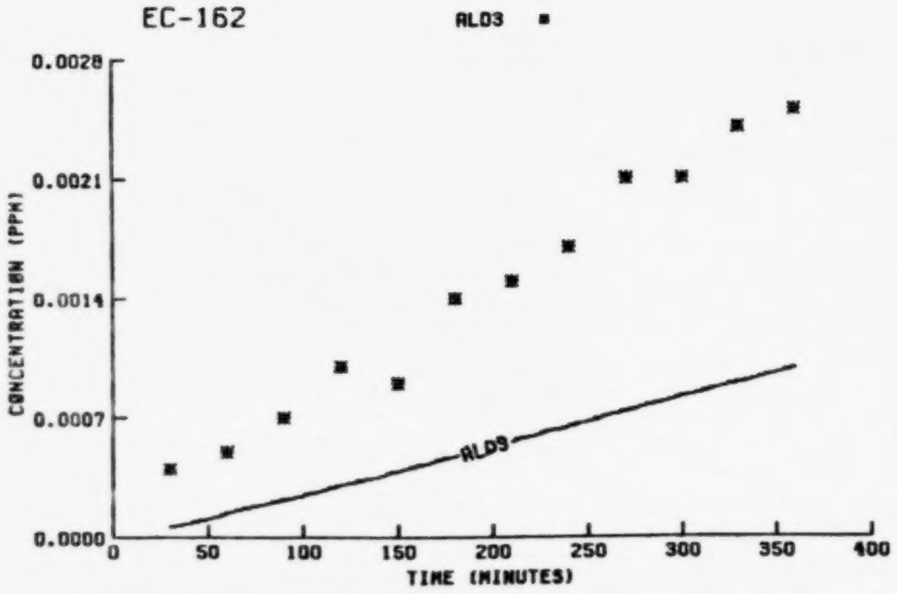

EC-162
O3
CONCENTRATION (PPM)
0.16
0.12
0.08
0.04
0.00
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

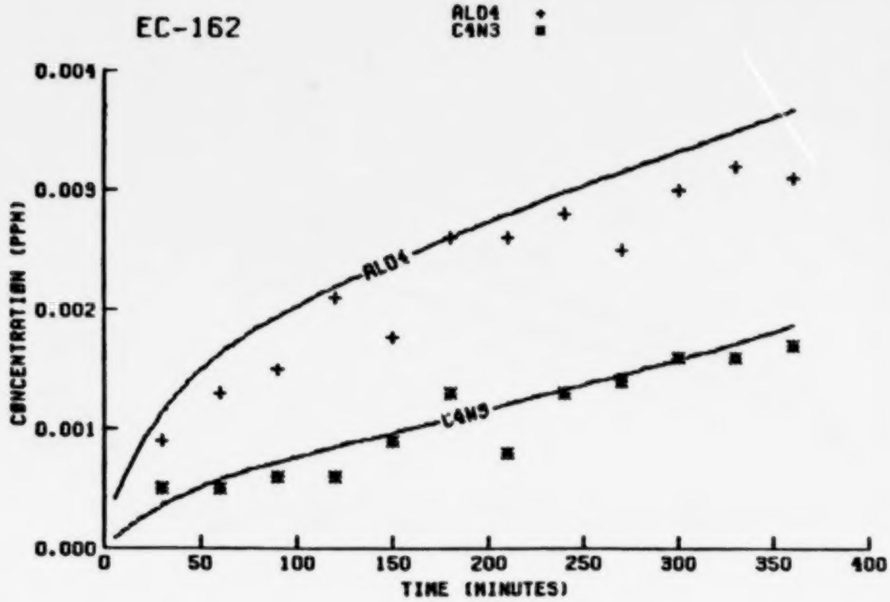

EC-162
NO2 +
NO
CONCENTRATION (PPM)
0.40
0.30
0.20
0.10
0.00
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

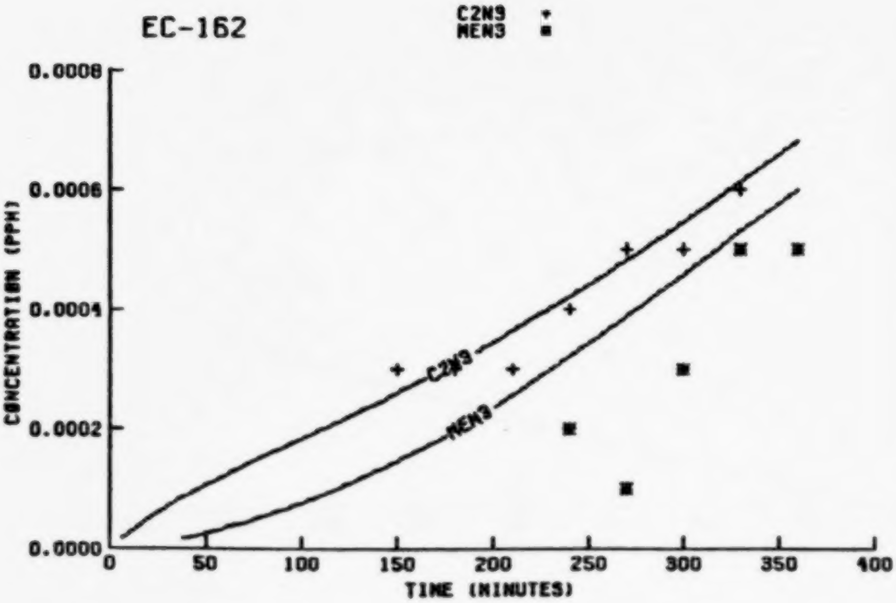

EC-162
BUT ■
2.20
2.00
1.80
1.60
1.40
CONCENTRATION (PPM)
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

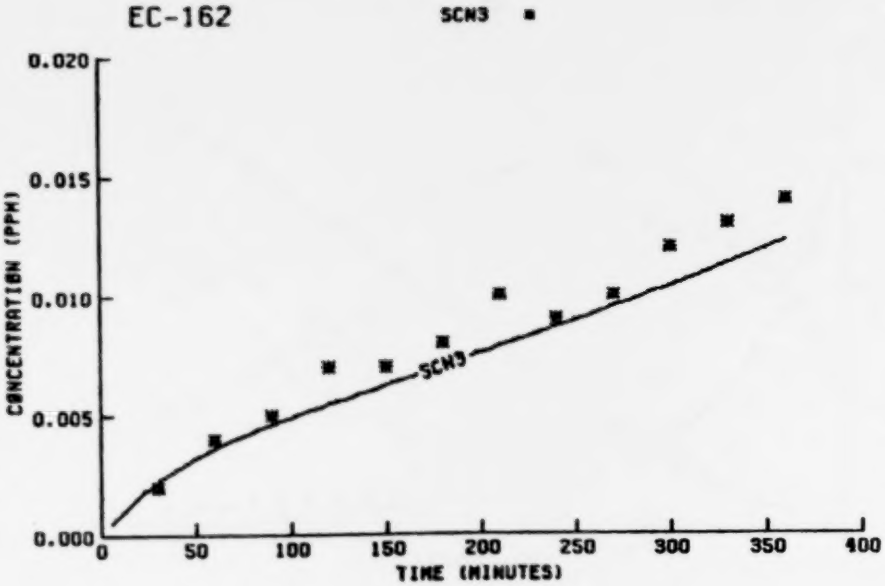

EC-162
FORM +
PAN ■
0.028
0.021
0.014
0.007
0.000
CONCENTRATION (PPM)
FORM
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

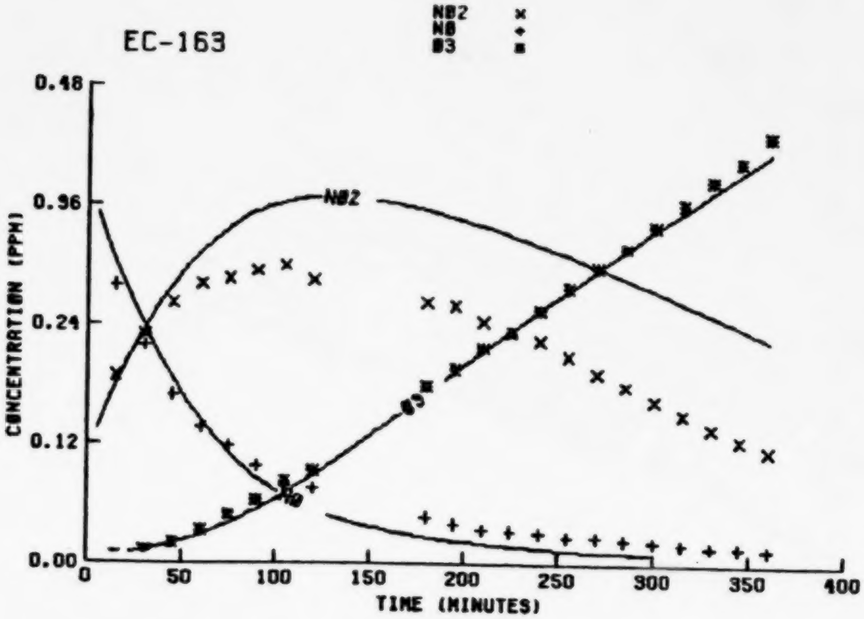

EC-162
MEK +
ALD2 ■
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEK
ALD2

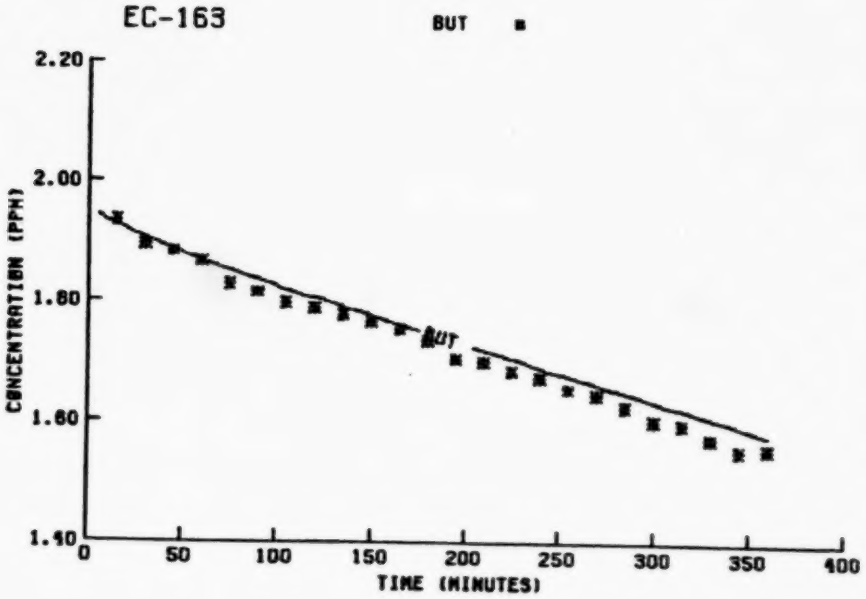

EC-162
ALD3 ■
0.0028
0.0021
0.0014
0.0007
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3

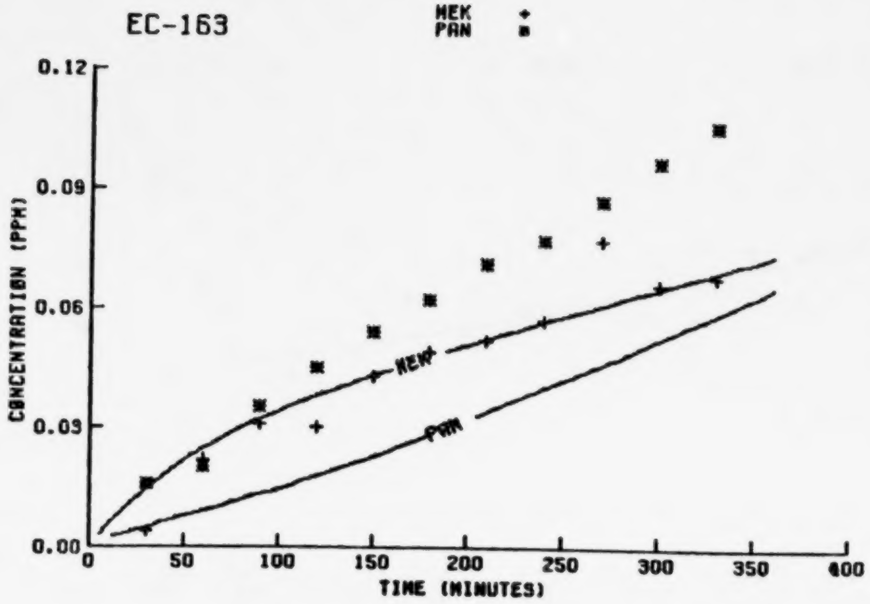

EC-162
ALD4 +
C4N3 ■
0.004
0.003
0.002
0.001
0.000
CONCENTRATION (PPM)
ALD4
C4N3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

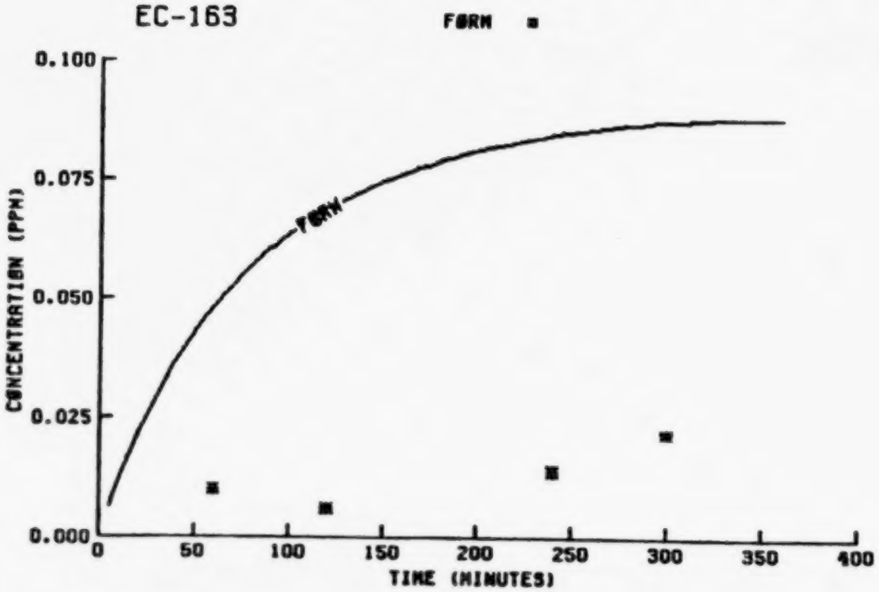

EC-162
C2N3 +
MEN3 ■
0.0008
0.0006
0.0004
0.0002
0.0000
CONCENTRATION (PPM)
C2N3
MEN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

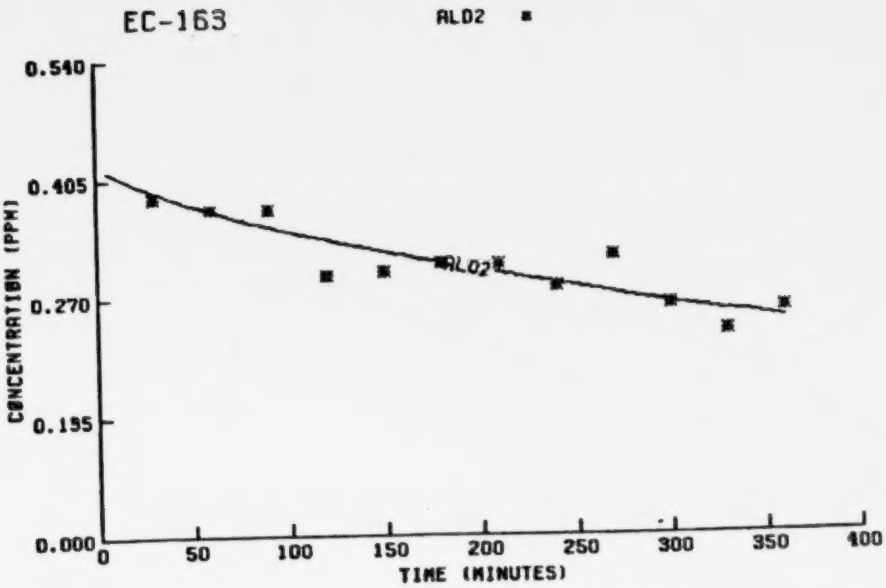

EC-162
SCN3 ■
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
SCN3

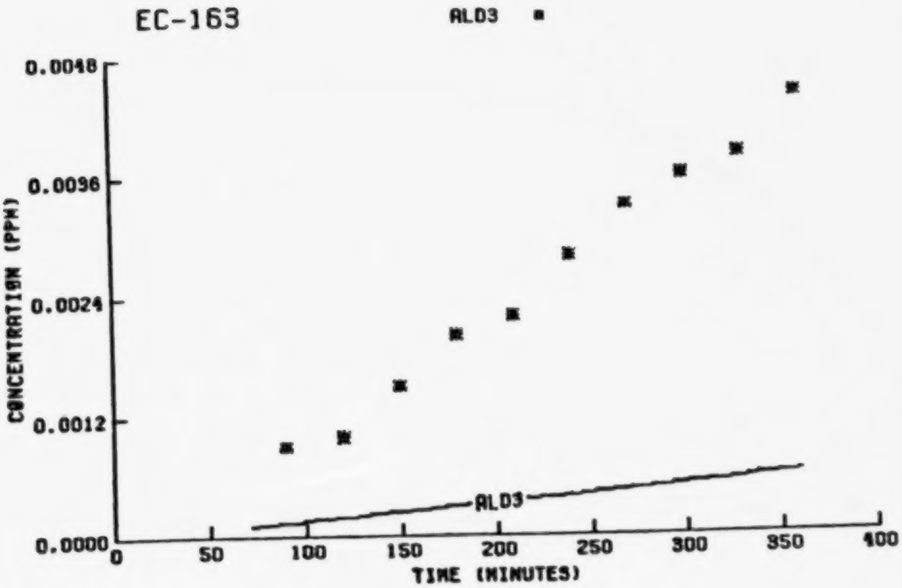

EC-163
NO2 ×
NO +
O3 *
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPM)
NO2
NO
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

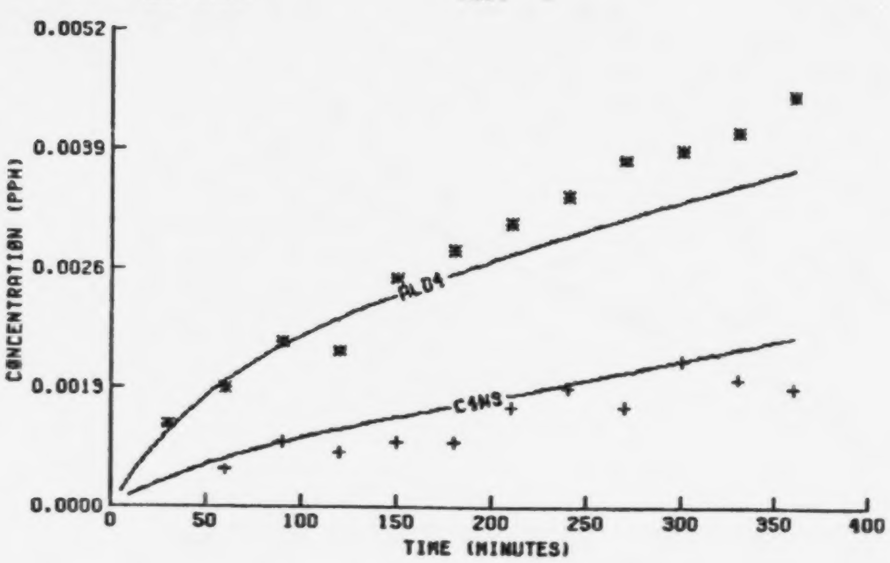

EC-163
BUT *
2.20
2.00
1.80
1.60
1.40
CONCENTRATION (PPM)
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

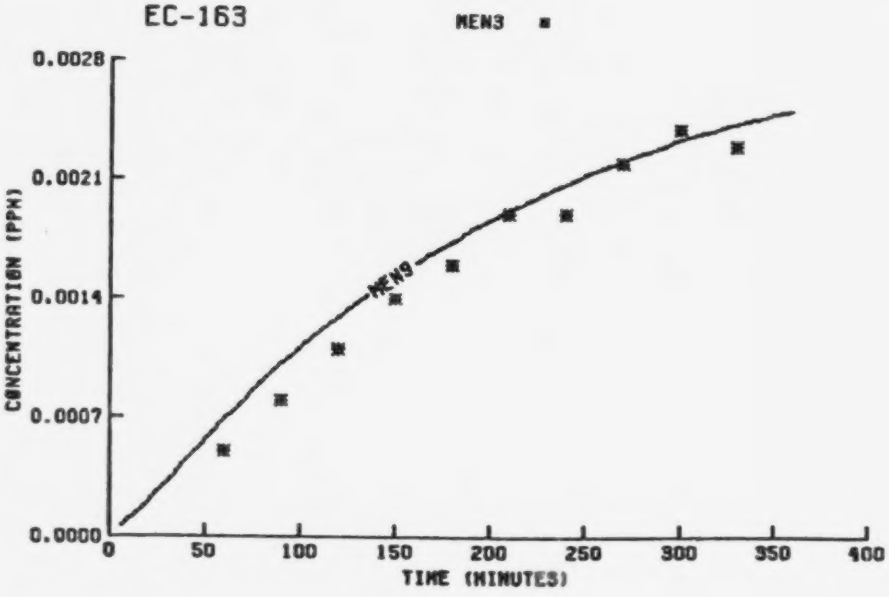

EC-163
MEK +
PAN ■
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEK
PAN

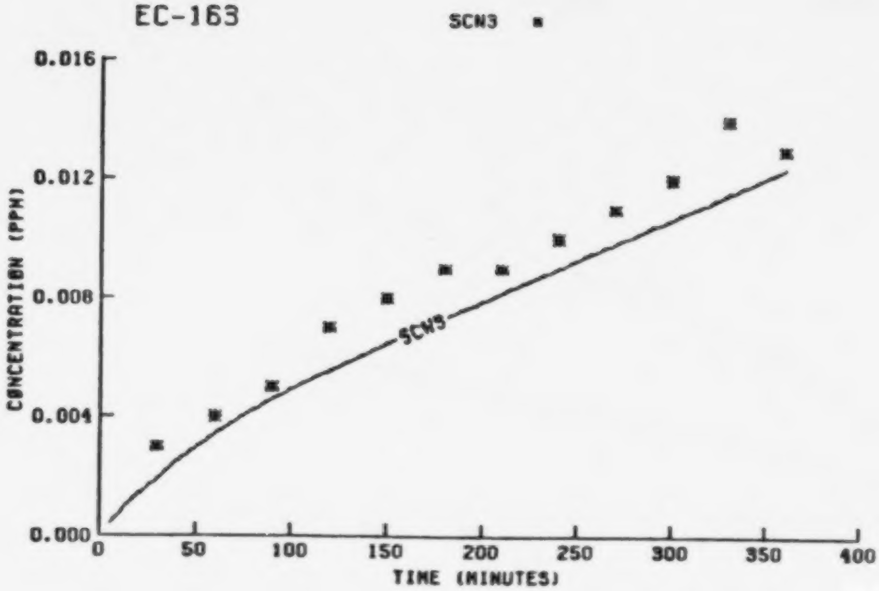

EC-163
FORM ■
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM


EC-163
ALD2 *
0.540
0.405
0.270
0.135
0.000
CONCENTRATION (PPM)
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

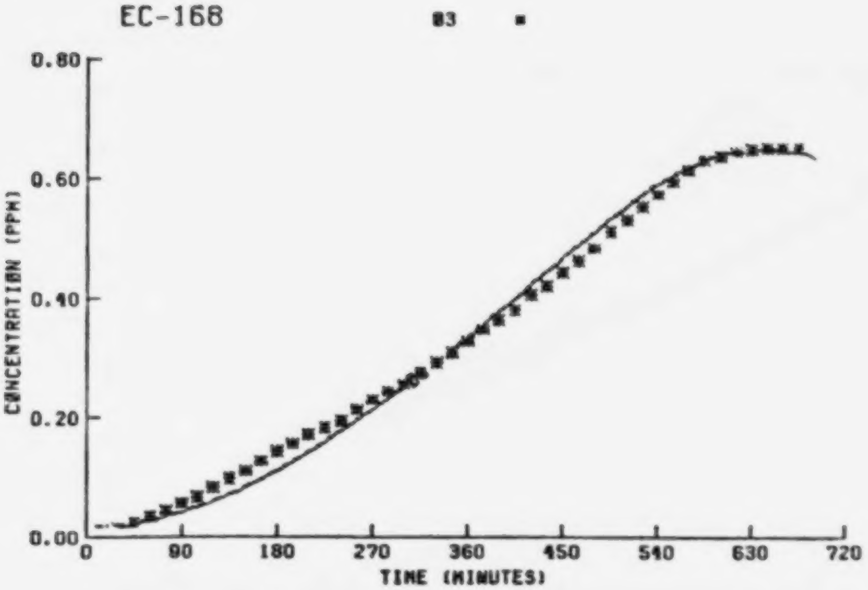

EC-163
ALD3 *
0.0048
0.0036
0.0024
0.0012
0.0000
CONCENTRATION (PPM)
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

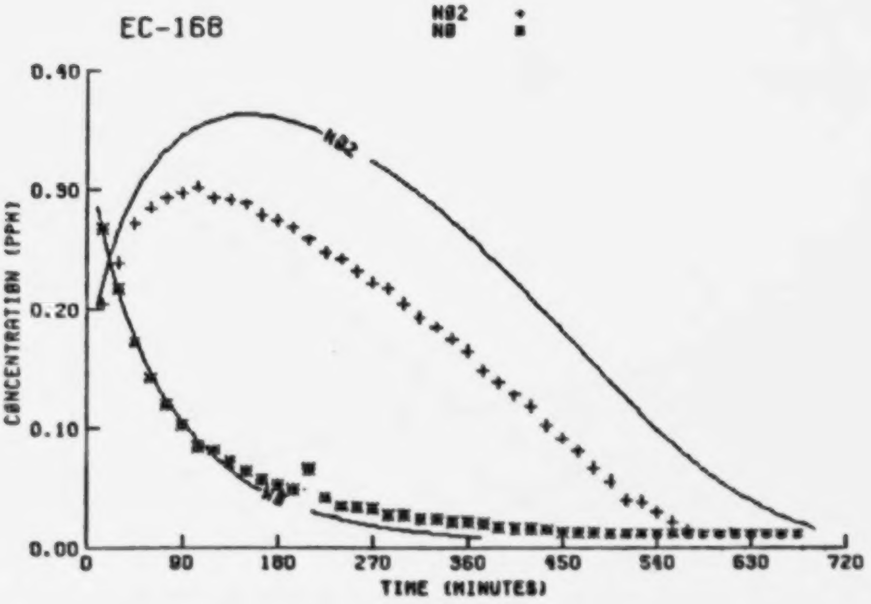

EC-163
C4N3 +
AL04 ✱
0.0052
0.0039
0.0026
0.0013
0.0000
CONCENTRATION (PPM)
AL04
C4N3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

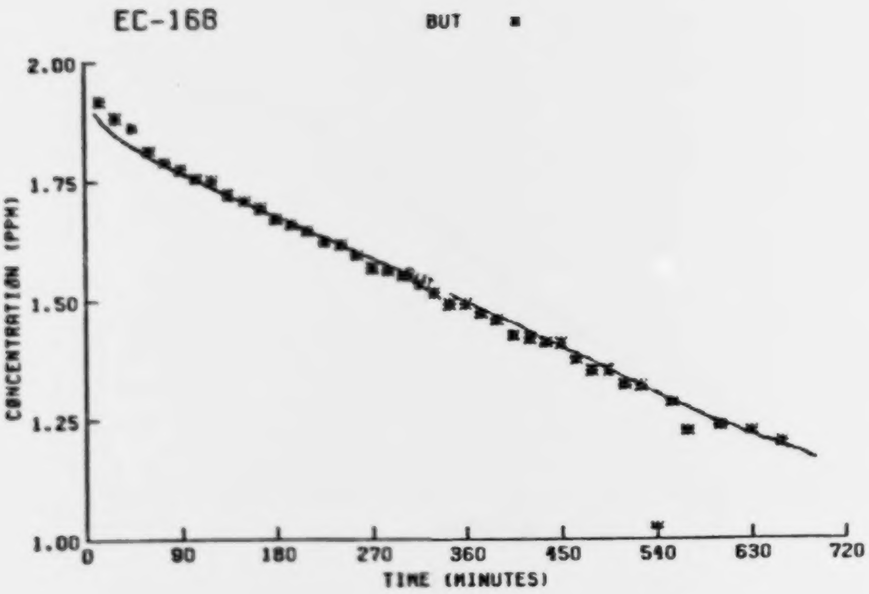

EC-163
MEN3 ✱
0.0028
0.0021
0.0014
0.0007
0.0000
CONCENTRATION (PPM)
MEN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

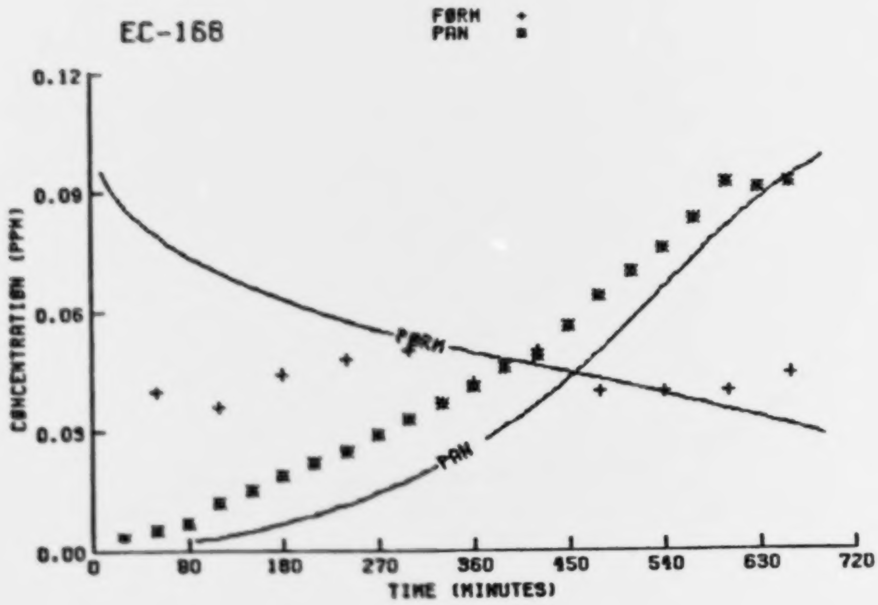


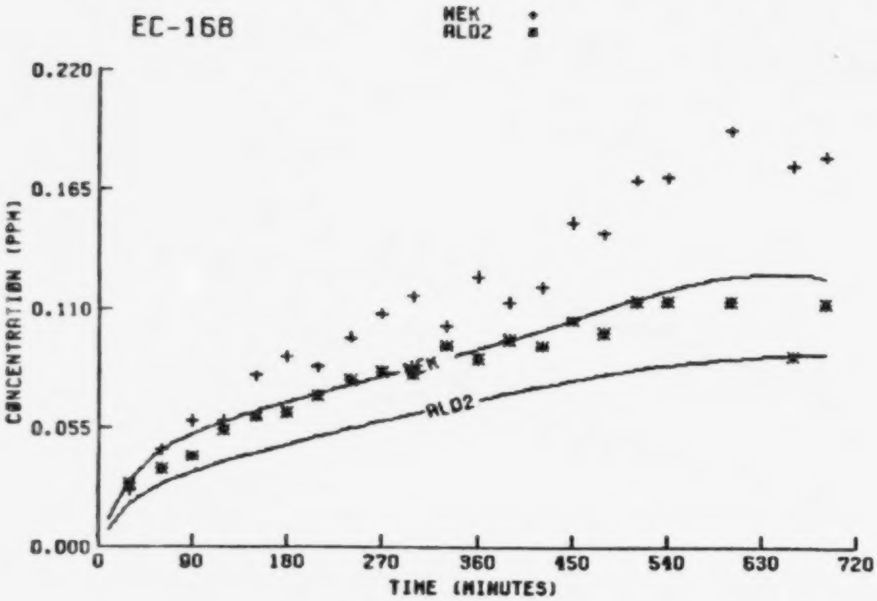
EC-163
SCN3 ▪
0.016
0.012
0.008
0.004
0.000
CONCENTRATION (PPM)
SCN5
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

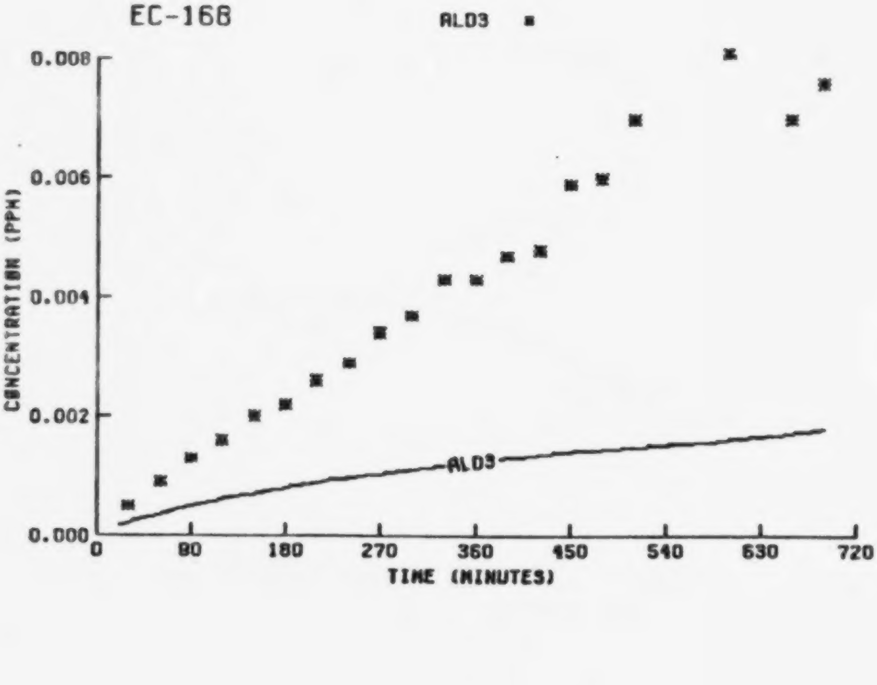

EC-168
O3 *
CONCENTRATION (PPM)
0.80
0.60
0.40
0.20
0.00
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

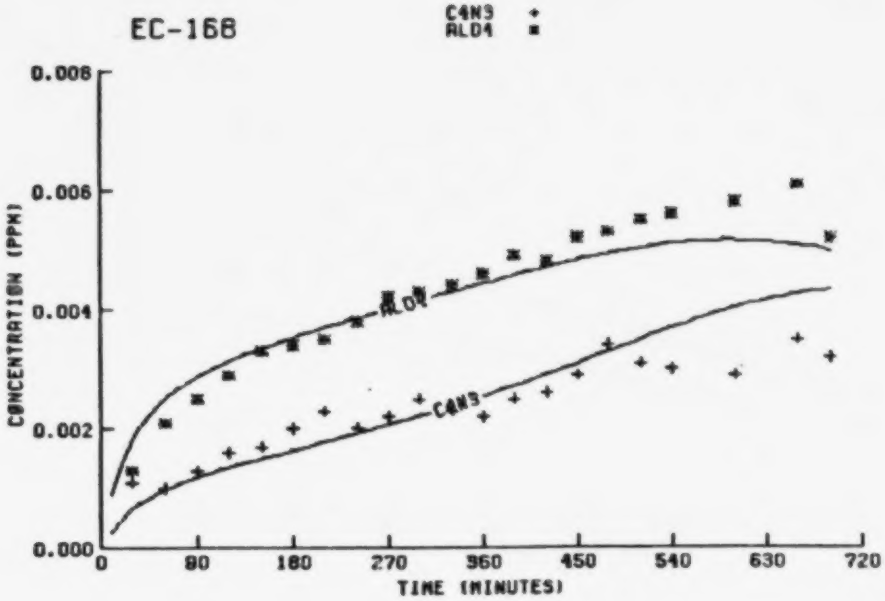

EC-168
NO2 +
NO *
CONCENTRATION (PPM)
0.40
0.30
0.20
0.10
0.00
NO2
NO
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

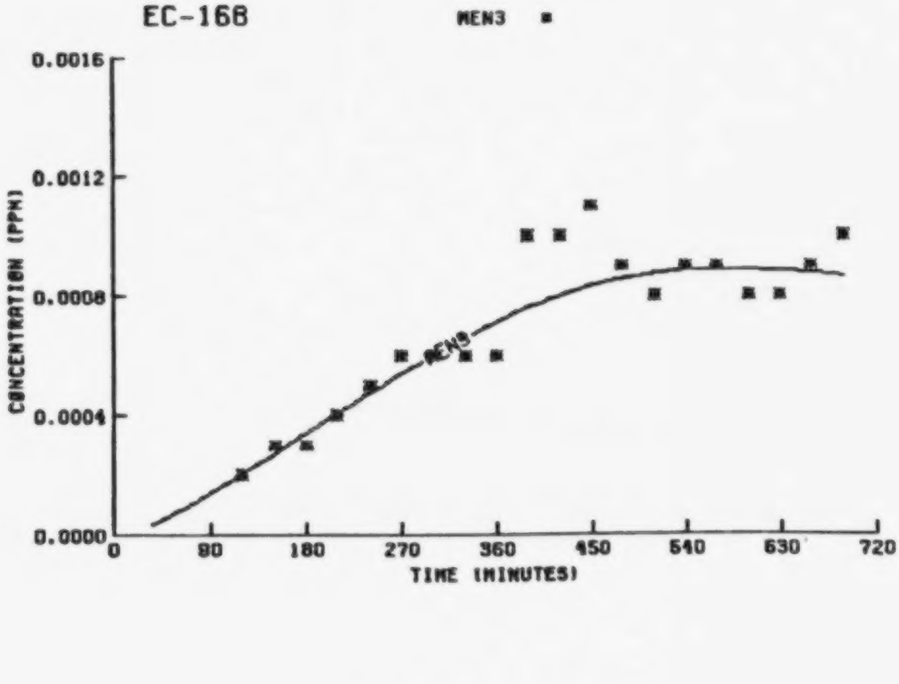

EC-168
BUT ■
2.00
1.75
1.50
1.25
1.00
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
BUT

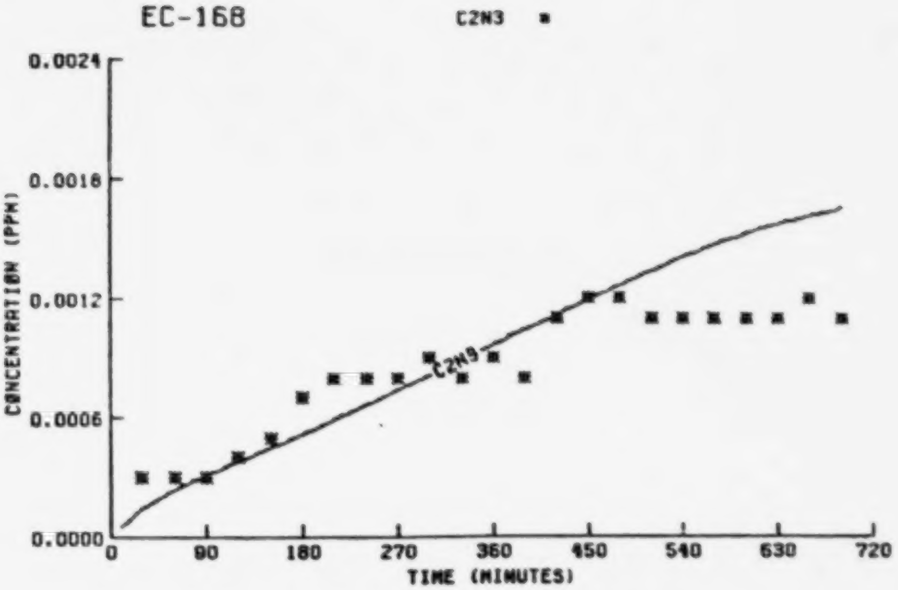

EC-168
FORM +
PAN ■
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
FORM
PAN

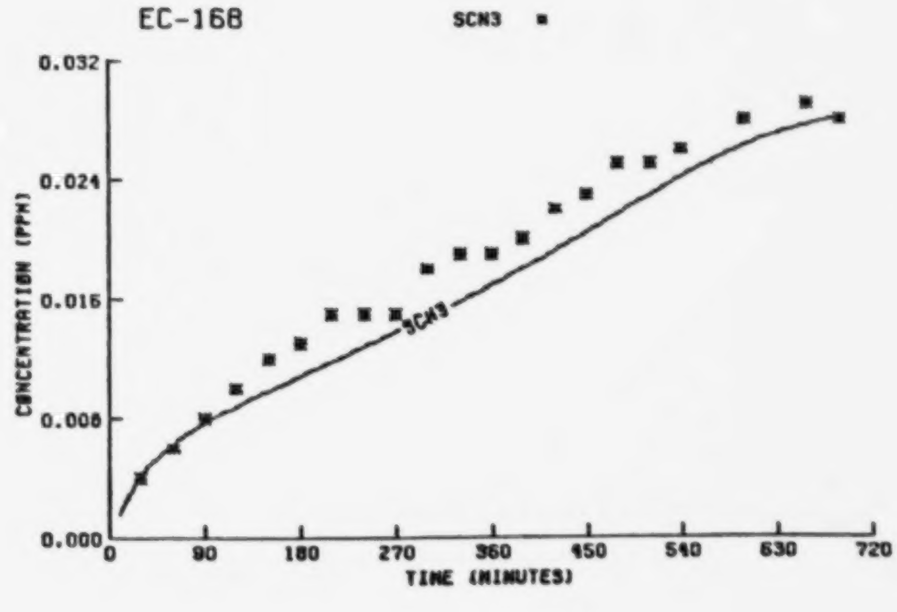

EC-168
MEK +
ALD2 ✱
0.220
0.165
0.110
0.055
0.000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
MEK
ALD2

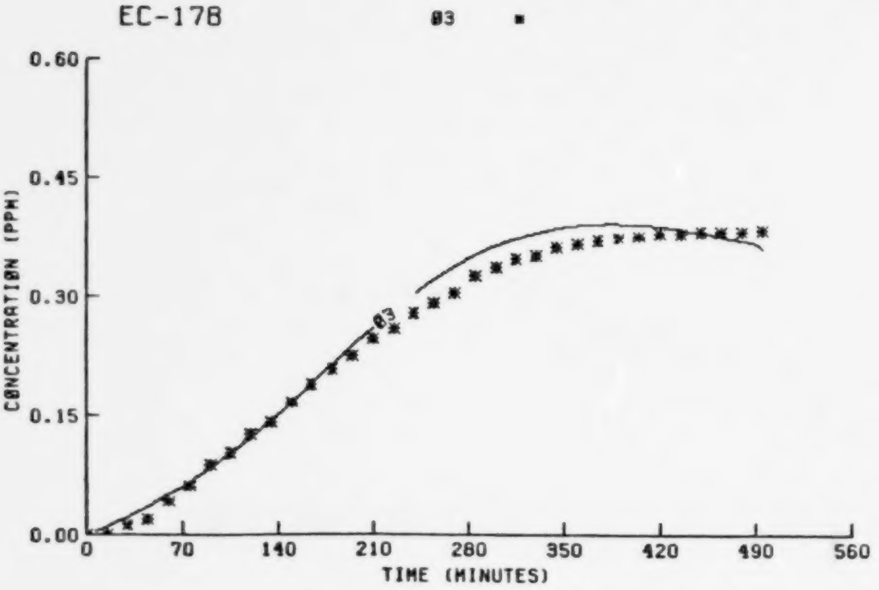

EC-168
ALD3 ✱
0.008
0.006
0.004
0.002
0.000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
ALD3

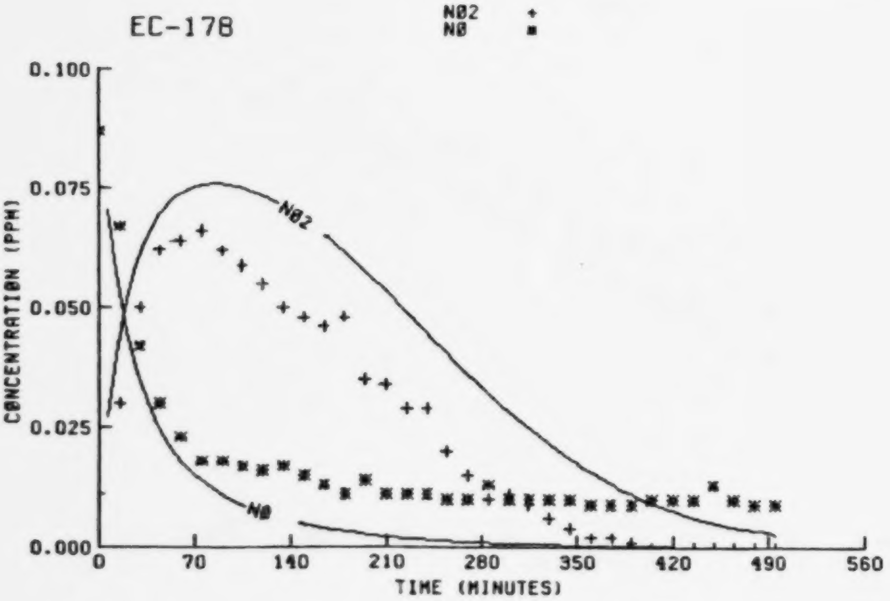

EC-168
C4N3 +
ALD4 ■
0.008
0.006
0.004
0.002
0.000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
ALD4
C4N3

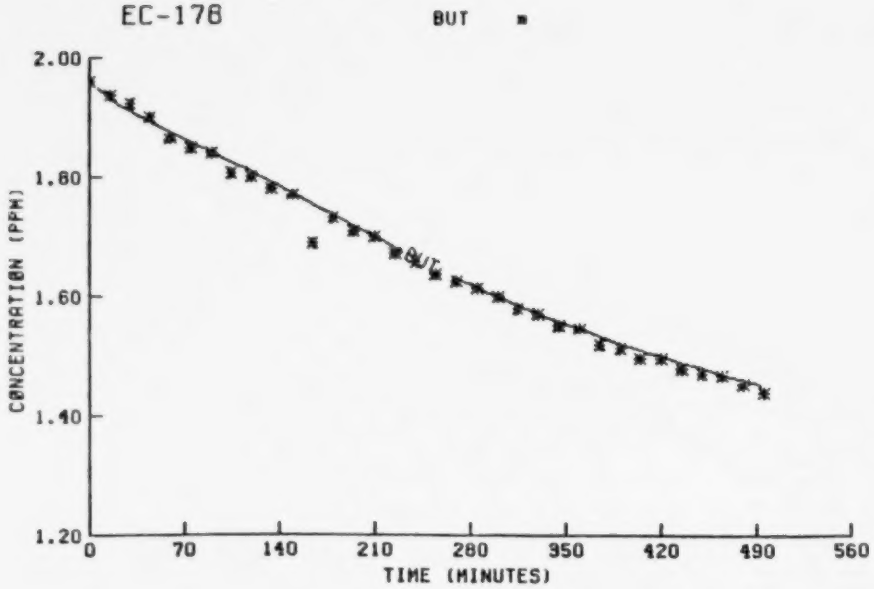

EC-168
MEN3 ■
0.0016
0.0012
0.0008
0.0004
0.0000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
MEN3

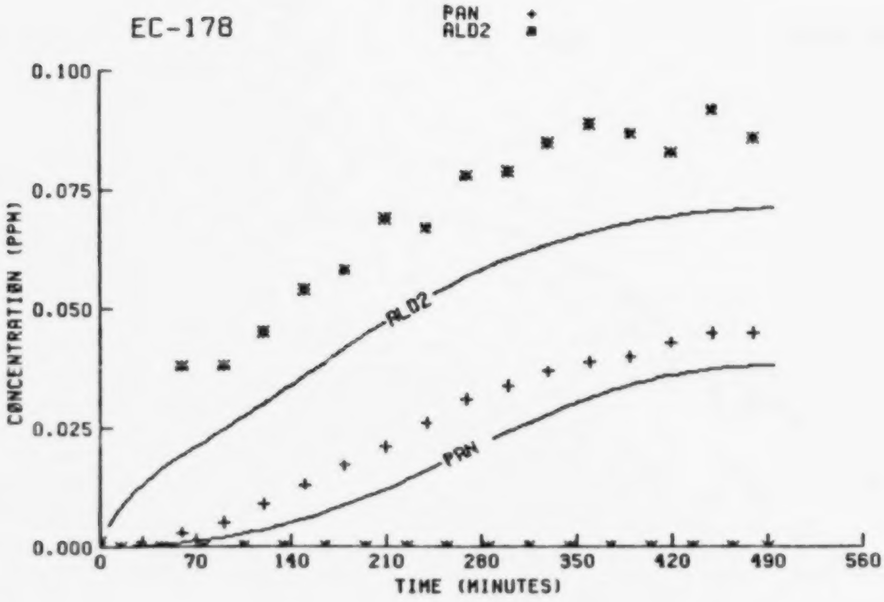

EC-168
C2N3 ■
0.0024
0.0018
0.0012
0.0006
0.0000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
C2N3

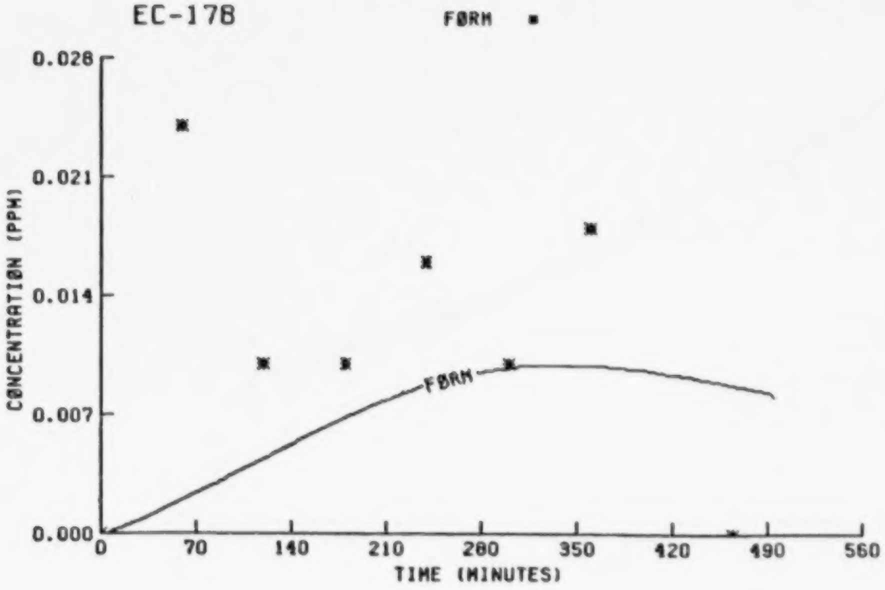

EC-168
SCN3 ■
0.032
0.024
0.016
0.008
0.000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
SCN3

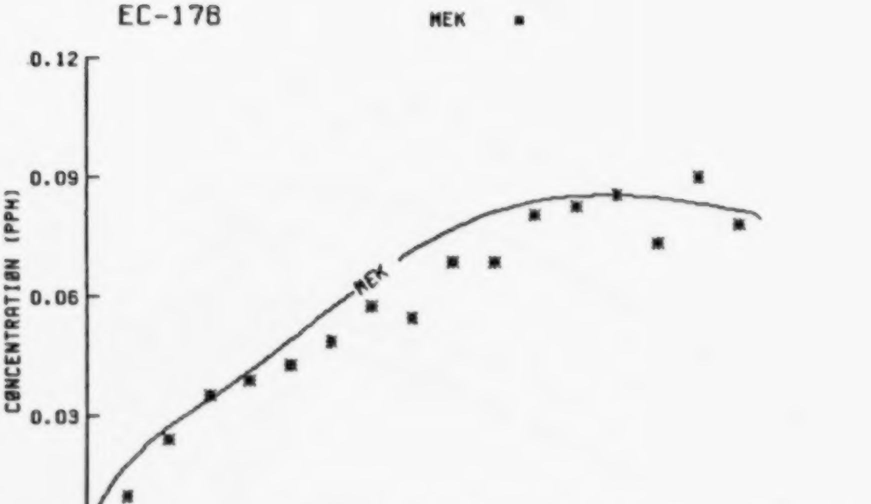

EC-178
O3 *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
O3

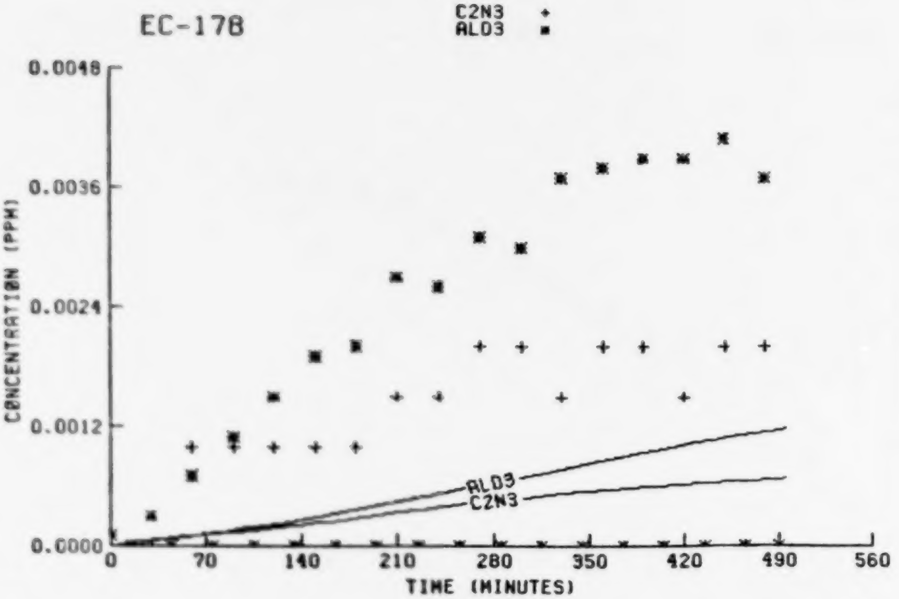

EC-178
NO2 +
NO *
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
NO2
NO

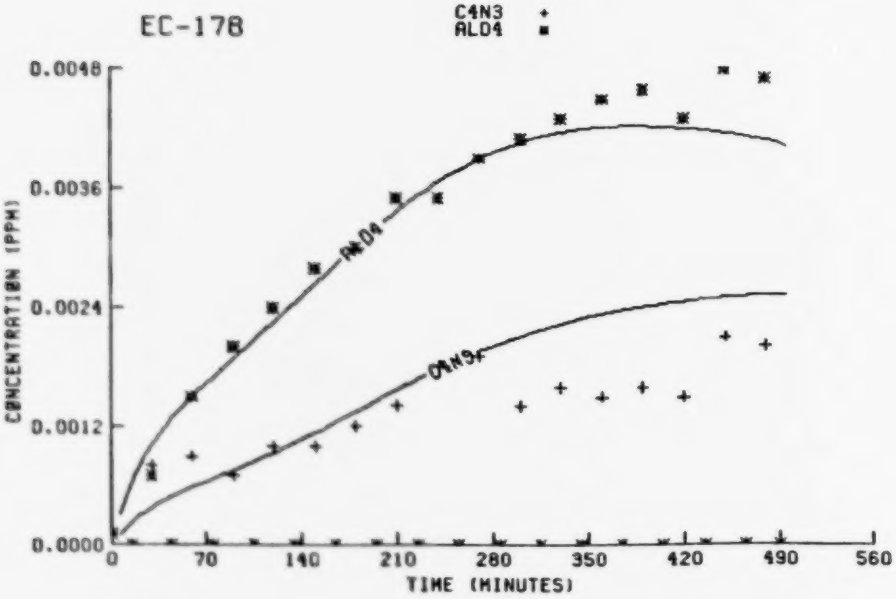

EC-178
BUT ✱
CONCENTRATION (PPM)
2.00
1.80
1.60
1.40
1.20
TIME (MINUTES)
0
70
140
210
280
350
420
490
560
BUT

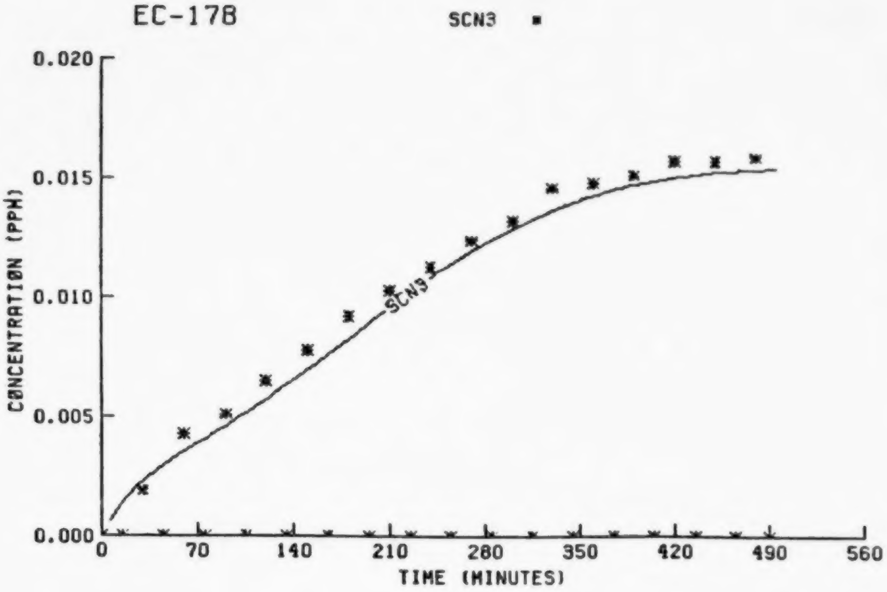

EC-178
PAN +
ALD2 ✱
CONCENTRATION (PPM)
0.100
0.075
0.050
0.025
0.000
TIME (MINUTES)
0
70
140
210
280
350
420
490
560
ALD2
PAN


EC-178
FØRM ■
0.028
0.021
0.014
0.007
0.000
CØNCENTRATIØN (PPM)
FØRM
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

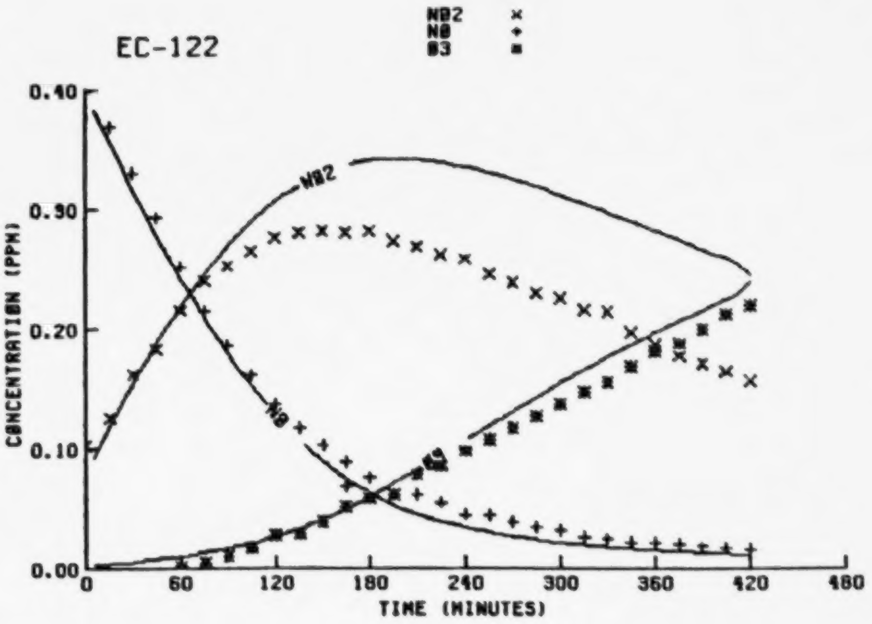

EC-178
MEK ■
0.12
0.09
0.06
0.03
0.00
CØNCENTRATIØN (PPM)
MEK
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

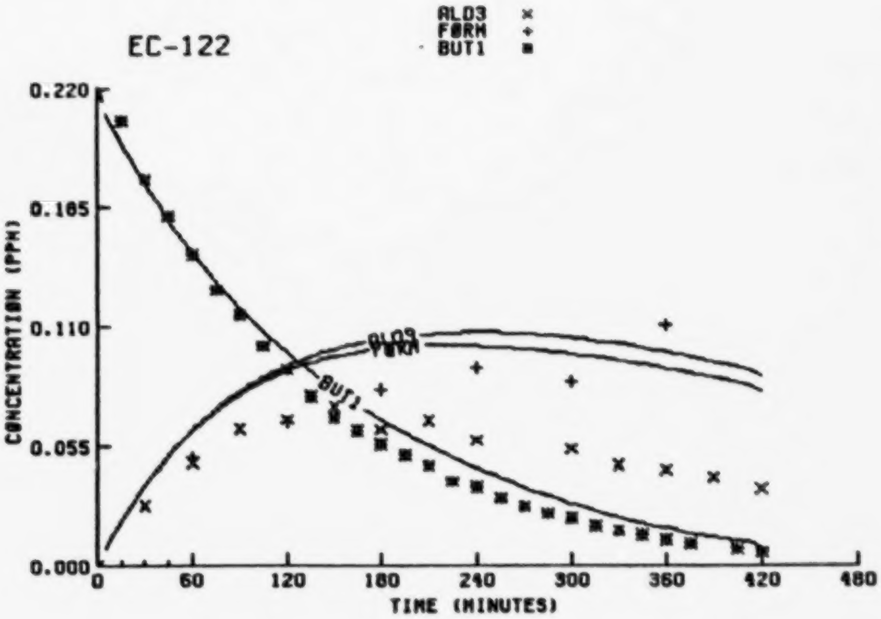

EC-17B
C2N3 +
ALD3 ■
0.0048
0.0036
0.0024
0.0012
0.0000
CONCENTRATION (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
ALD3
C2N3

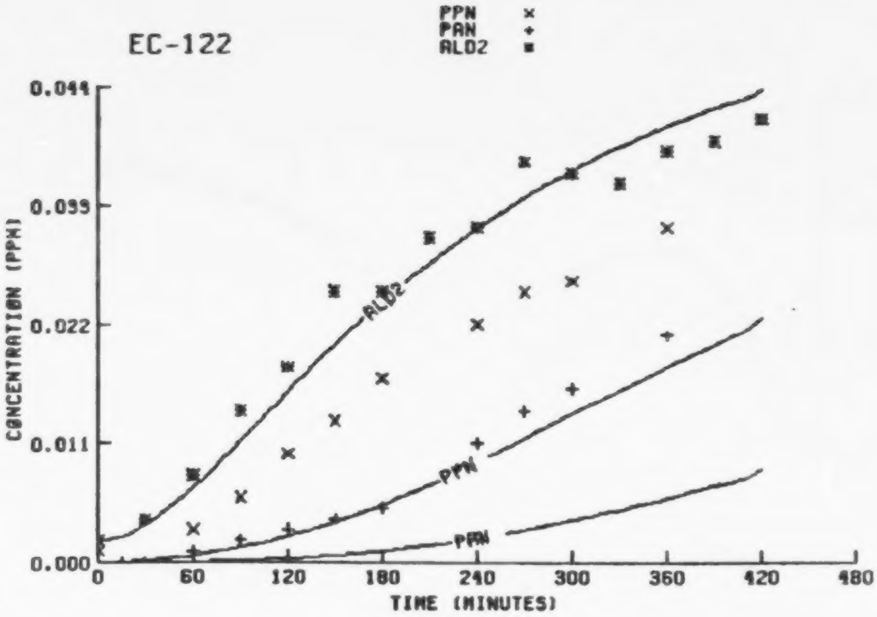

EC-17B
C4N3 +
ALD4 ■
0.0048
0.0036
0.0024
0.0012
0.0000
CONCENTRATION (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
ALD4
C4N3

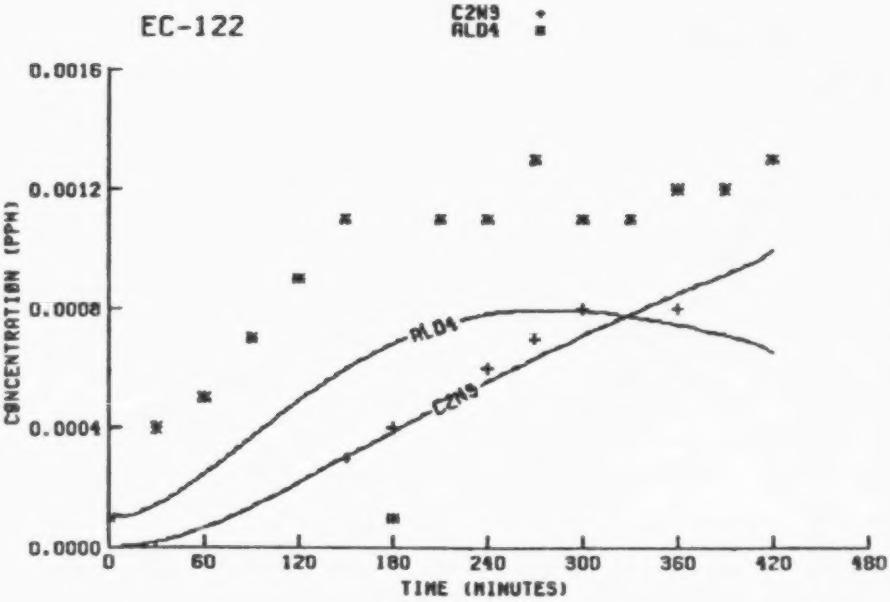

EC-178
SCN3 ■
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
SCN3
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

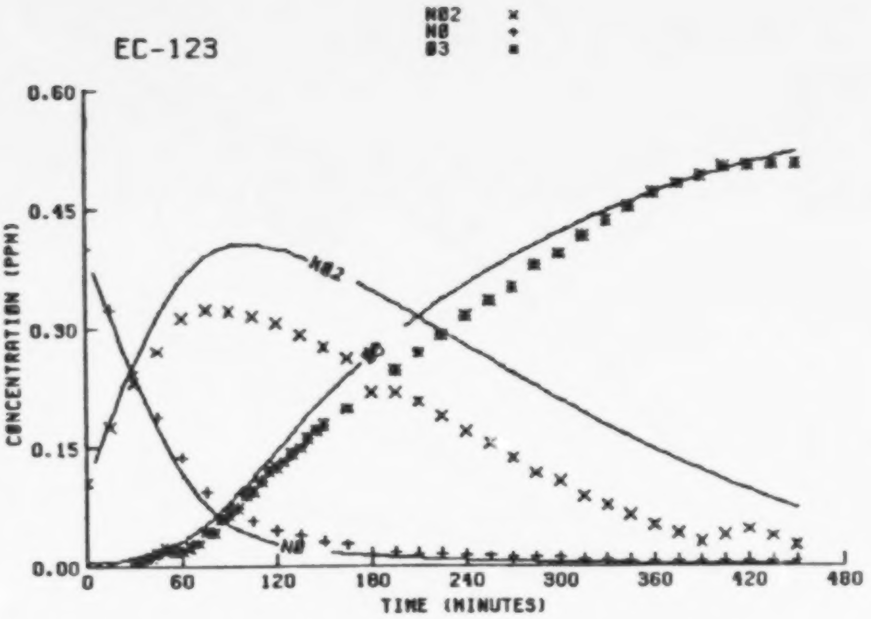
UCR 1-BUTENE EXPERIMENTS

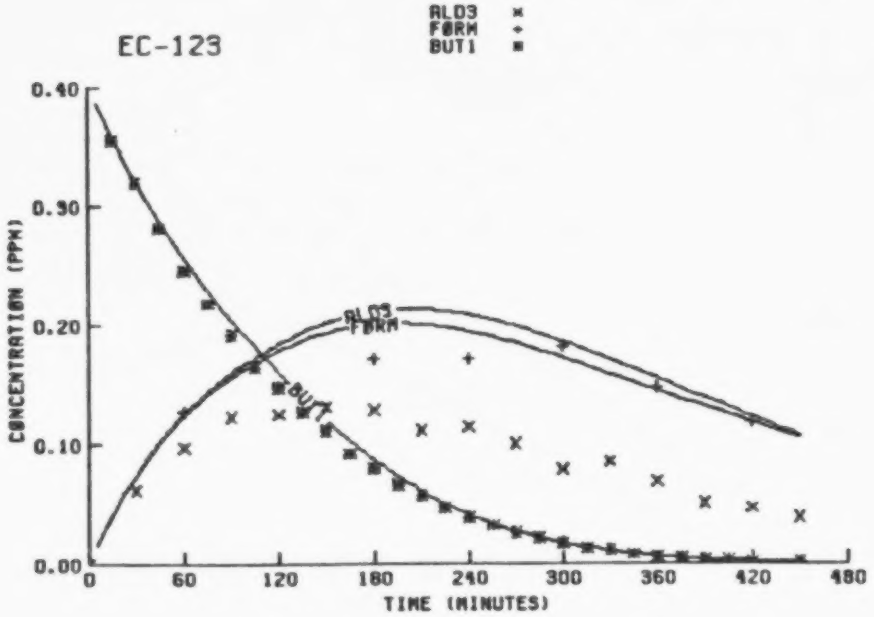

EC-122
NO2 ×
NO +
O3 ▪
CONCENTRATION (PPM)
0.40
0.30
0.20
0.10
0.00
TIME (MINUTES)
0
60
120
180
240
300
360
420
480
NO2
NO
O3

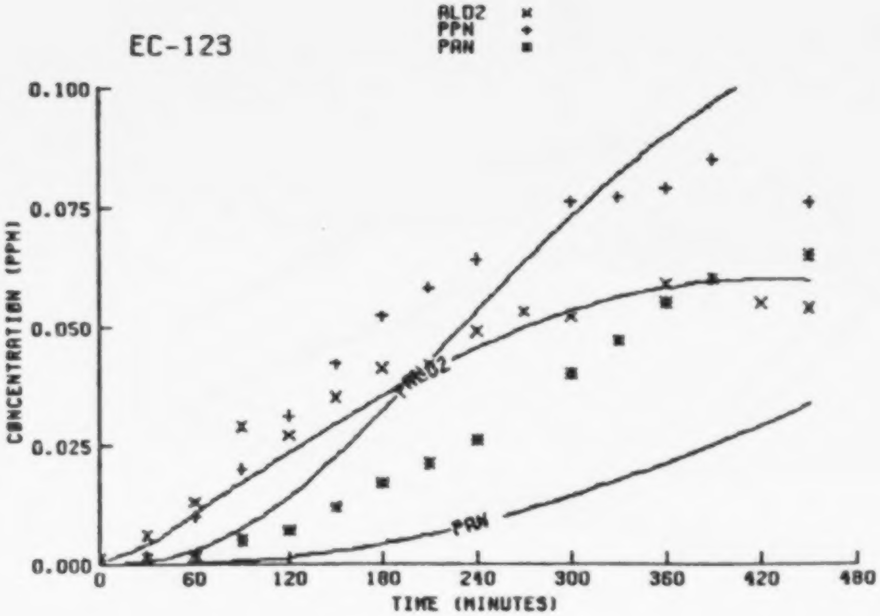

EC-122
ALD3 ×
FORM +
BUT1 ▪
CONCENTRATION (PPM)
0.220
0.165
0.110
0.055
0.000
TIME (MINUTES)
0
60
120
180
240
300
360
420
480
ALD3
FORM
BUT1

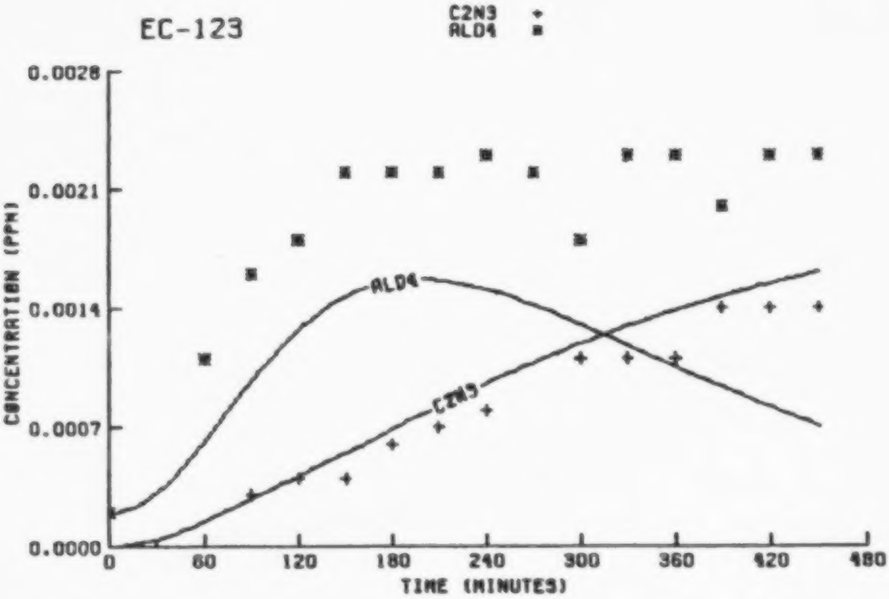

EC-122
PPN ×
PAN +
ALD2 ✱
0.044
0.033
0.022
0.011
0.000
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD2
PPN
PAN

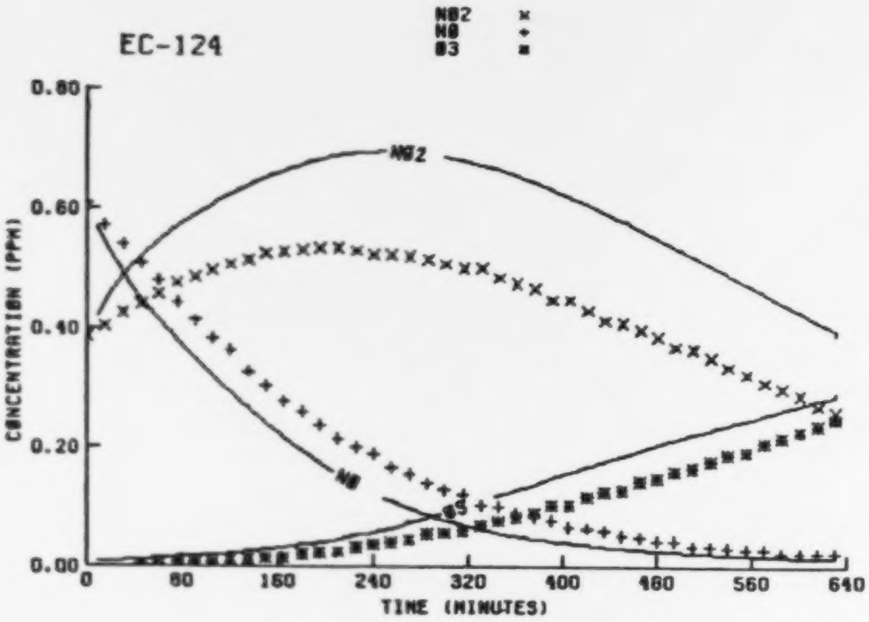

EC-122
C2N9 +
ALD4 ✱
0.0016
0.0012
0.0008
0.0004
0.0000
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD4
C2N9

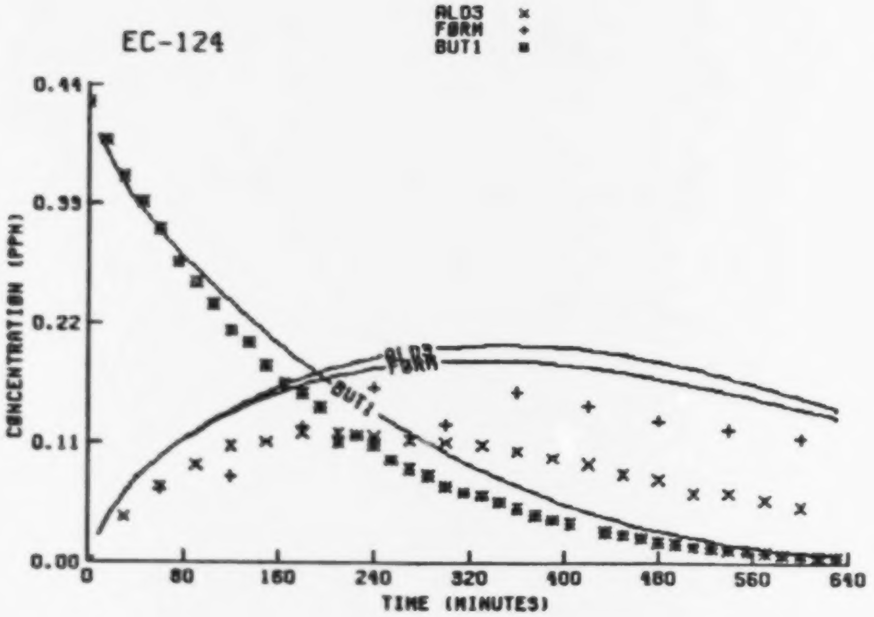

EC-123
NØ2 ×
NØ +
Ø3 ▪
CØNCENTRATIØN (PPM)
0.60
0.45
0.30
0.15
0.00
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
NØ2
NØ
Ø3

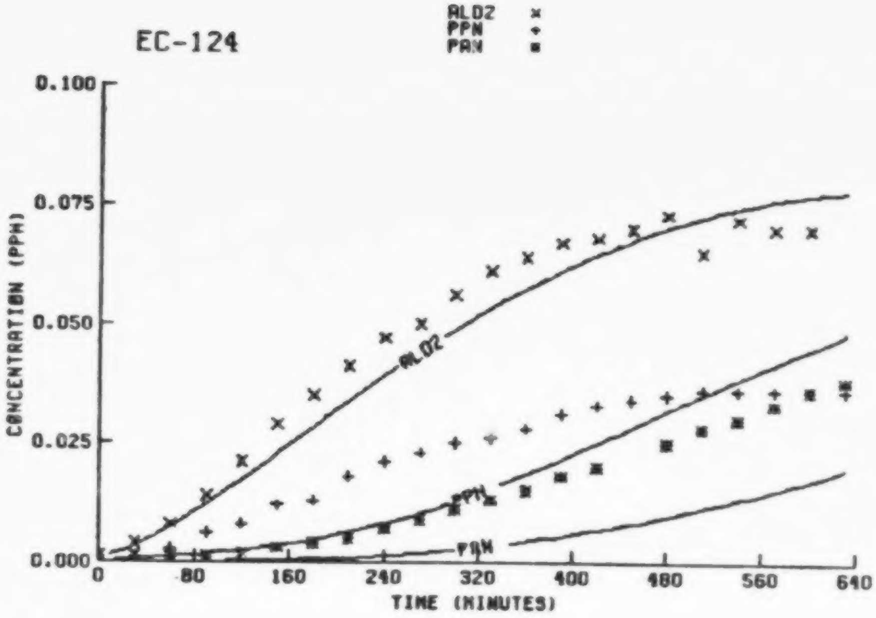

EC-123
ALD3 ×
FØRM +
BUT1 ▪
CØNCENTRATIØN (PPM)
0.40
0.30
0.20
0.10
0.00
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD3
FØRM
BUT1

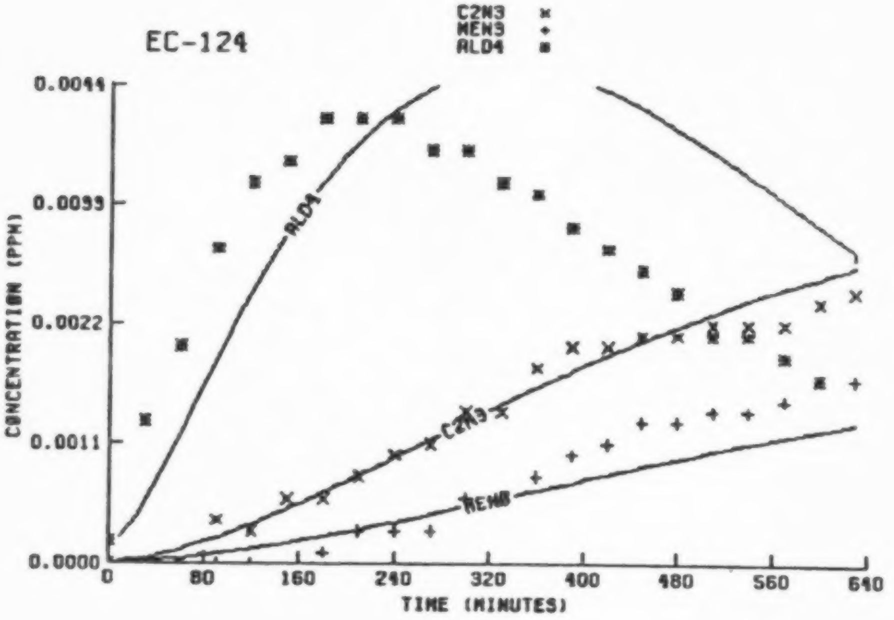

EC-123
ALD2 ×
PPN +
PAN ▪
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
PPN
ALD2
PAN


EC-123
C2N3 +
ALD4 ▪
0.0028
0.0021
0.0014
0.0007
0.0000
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD4
C2N3

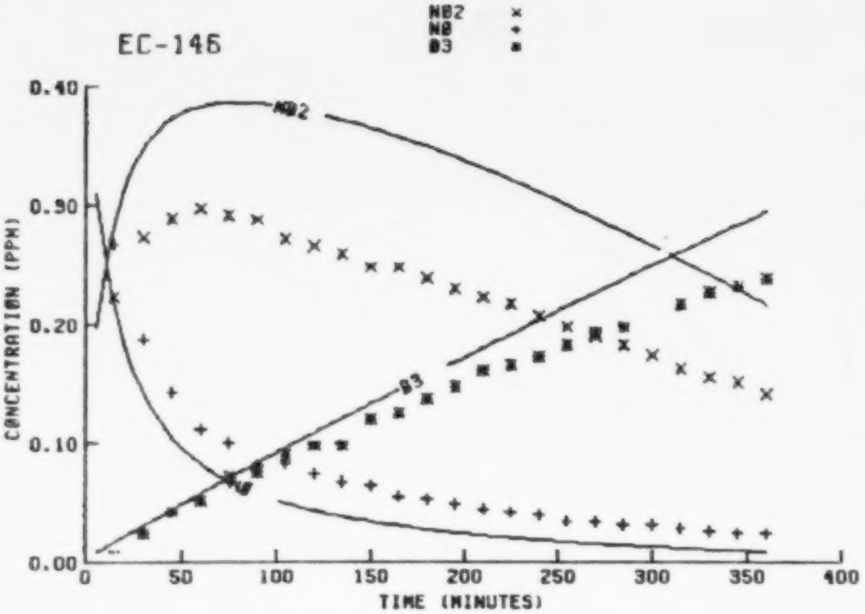

EC-124
NØ2 ×
NØ +
Ø3 ✱
CØNCENTRATIØN (PPM)
0.00
0.20
0.40
0.60
0.80
NØ2
NØ
Ø3
TIME (MINUTES)
0
80
160
240
320
400
480
560
640

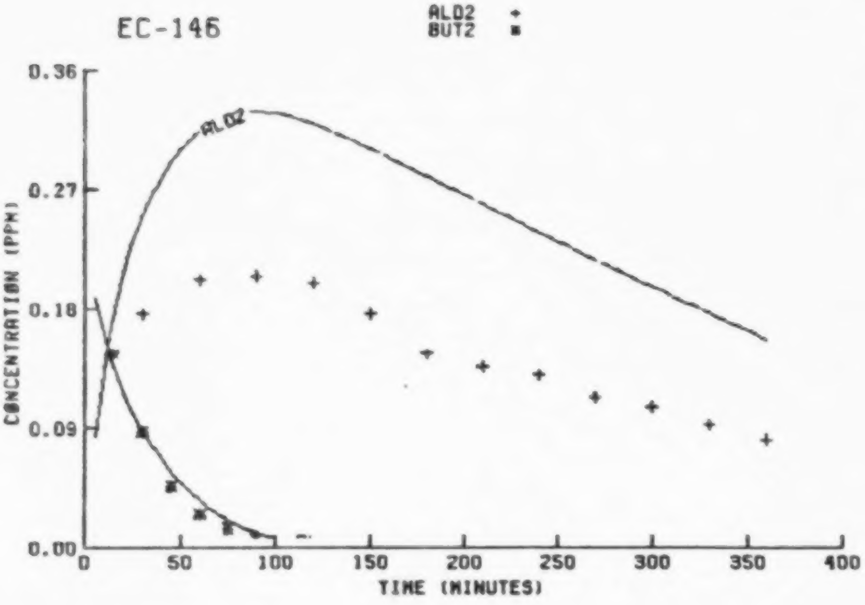

EC-124
ALD3 ×
FØRM +
BUT1 ✱
CØNCENTRATIØN (PPM)
0.00
0.11
0.22
0.33
0.44
ALD3
FØRM
BUT1
TIME (MINUTES)
0
80
160
240
320
400
480
560
640

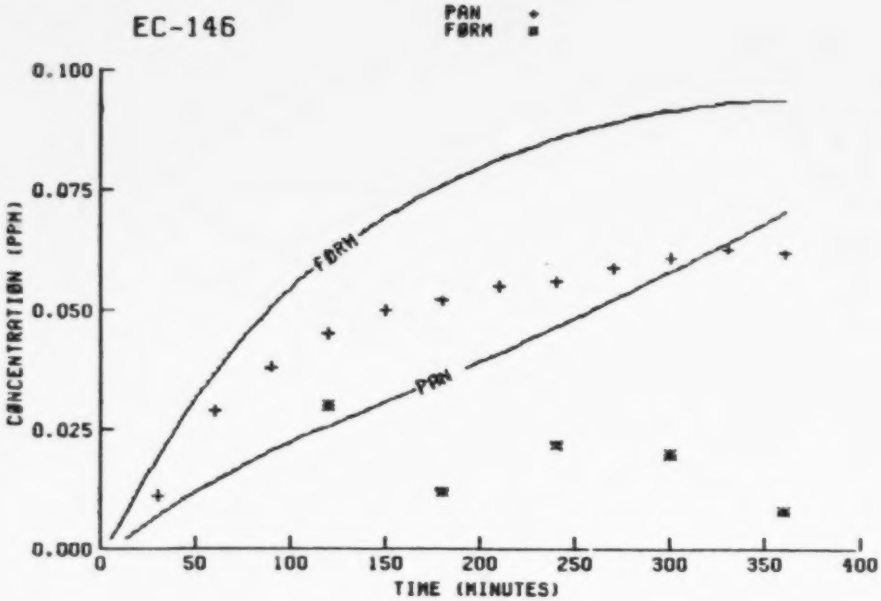

EC-124
ALD2 ×
PPN +
PAN ■
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
80
160
240
320
400
480
560
640
TIME (MINUTES)
ALD2
PPN
PAN

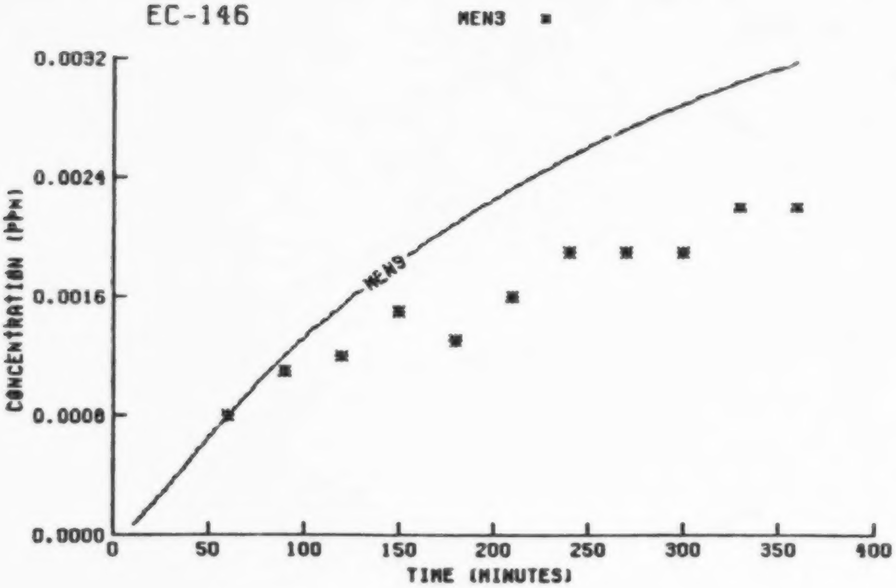

EC-124
C2N3 ×
MEN3 +
ALD4 ■
0.0044
0.0033
0.0022
0.0011
0.0000
CONCENTRATION (PPM)
0
80
160
240
320
400
480
560
640
TIME (MINUTES)
ALD4
C2N3
MEN3

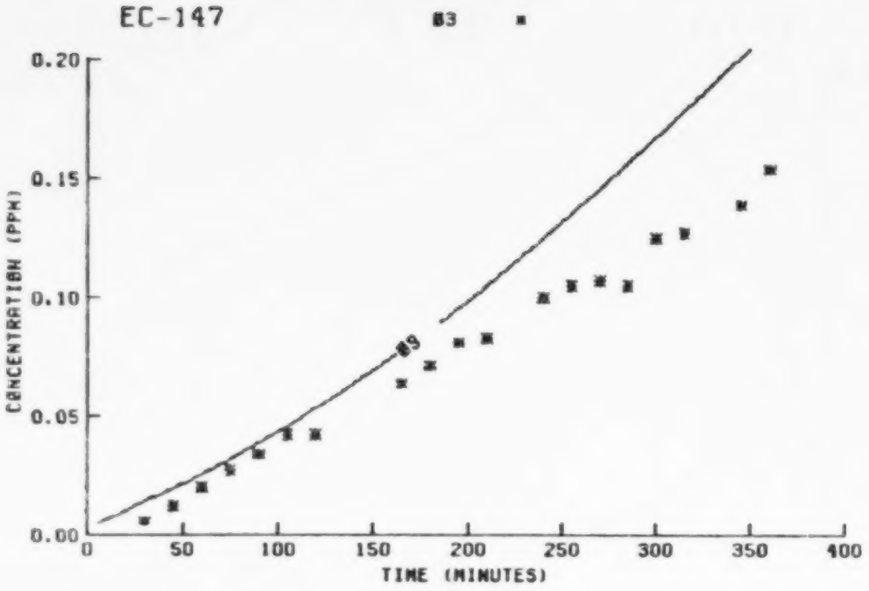
UCR TRANS-2-BUTENE EXPERIMENTS

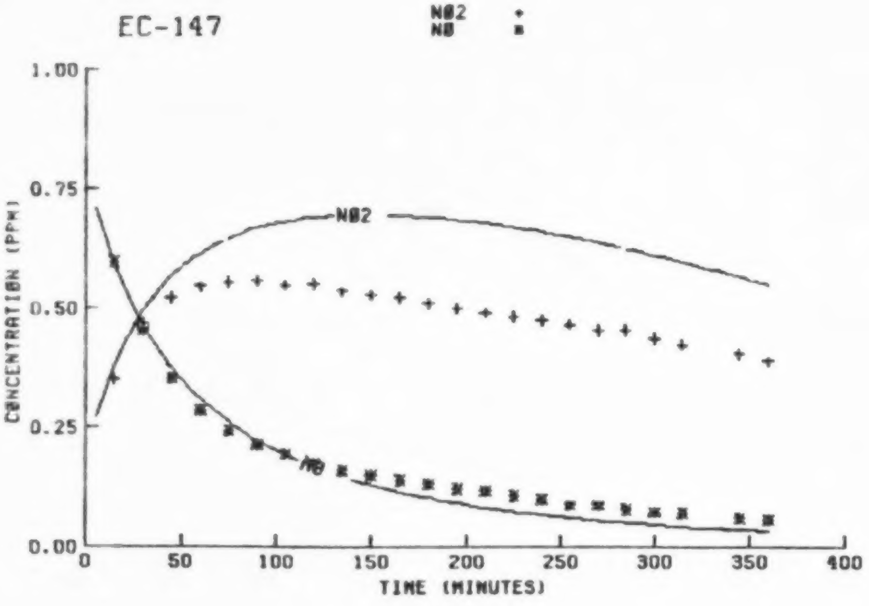

EC-146
NO2 ×
NO +
O3 ■
NO2
O3
CONCENTRATION (PPM)
0.00
0.10
0.20
0.30
0.40
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

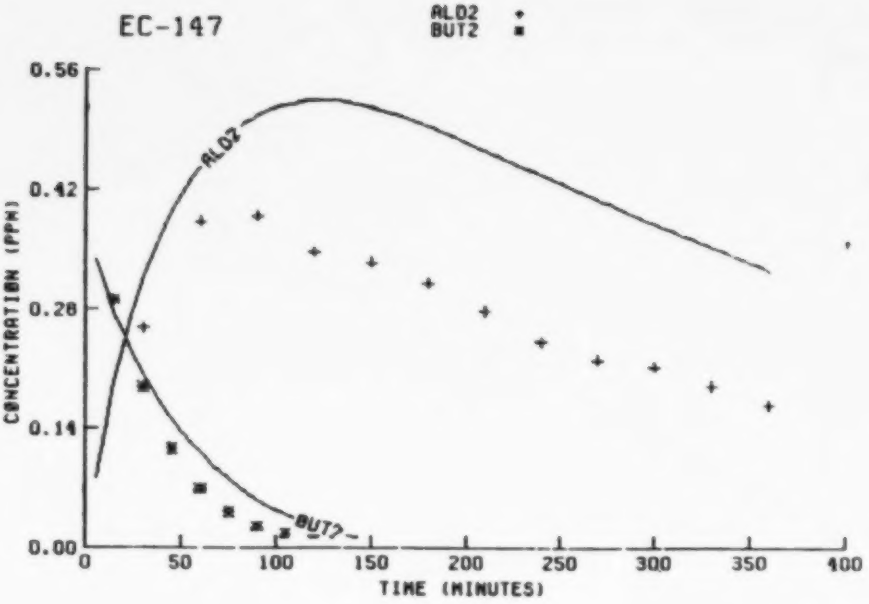

EC-146
ALD2 +
BUT2 ■
ALD2
CONCENTRATION (PPM)
0.00
0.09
0.18
0.27
0.36
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

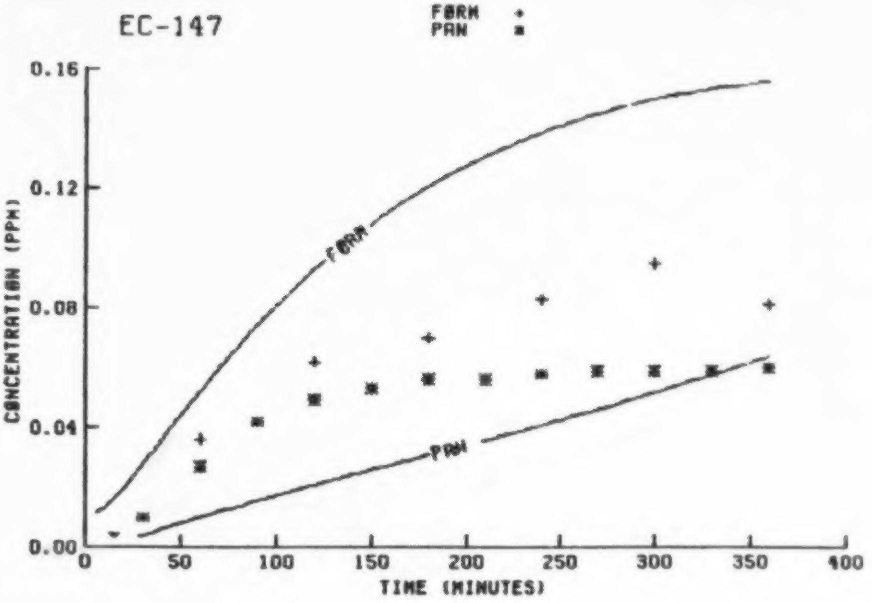

EC-146
PAN +
FØRM ✱
CONCENTRATIØN (PPM)
0.100
0.075
0.050
0.025
0.000
FØRM
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

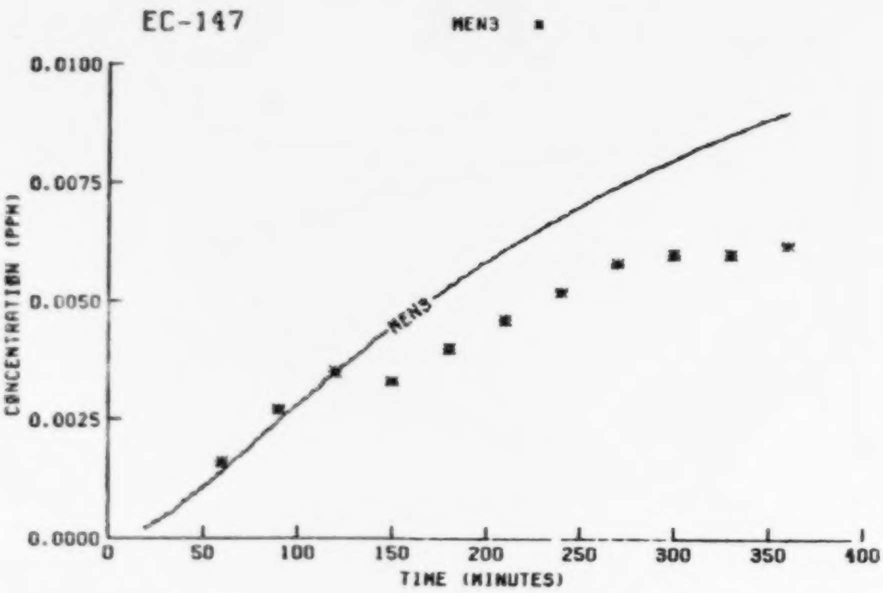

EC-146
MEN3 ✱
CØNCENTRATIØN (PPM)
0.0032
0.0024
0.0016
0.0008
0.0000
MEN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

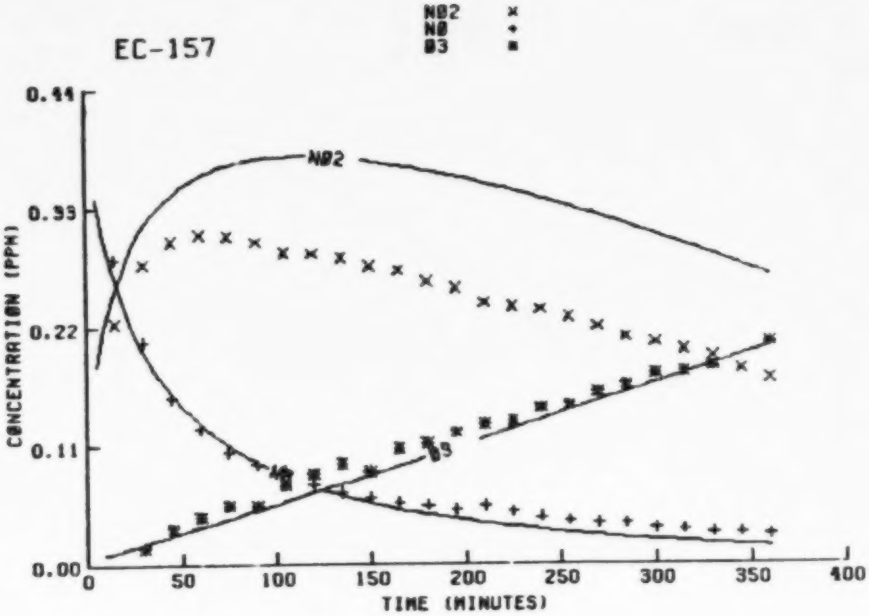

EC-147
03 ×
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
03
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

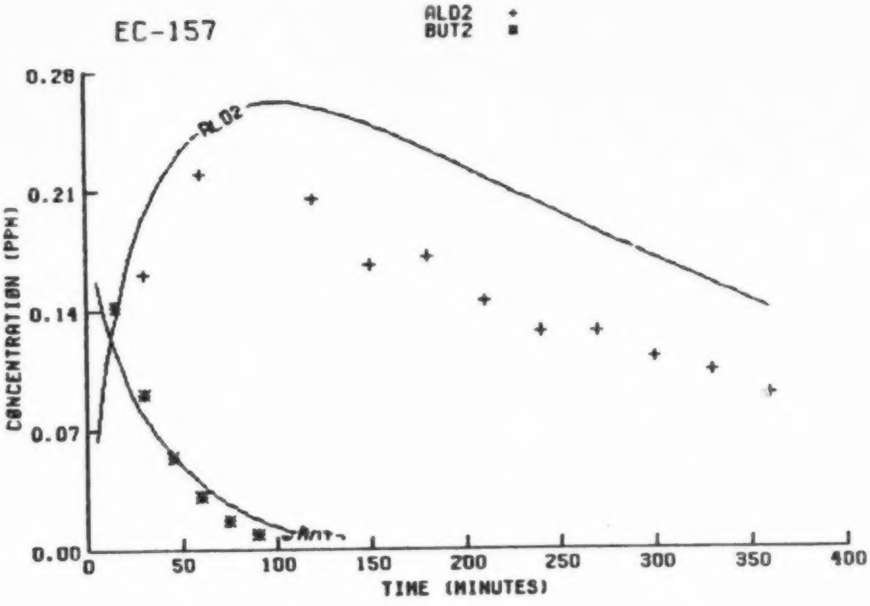

EC-147
N02 +
N0 ×
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
N02
N0
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

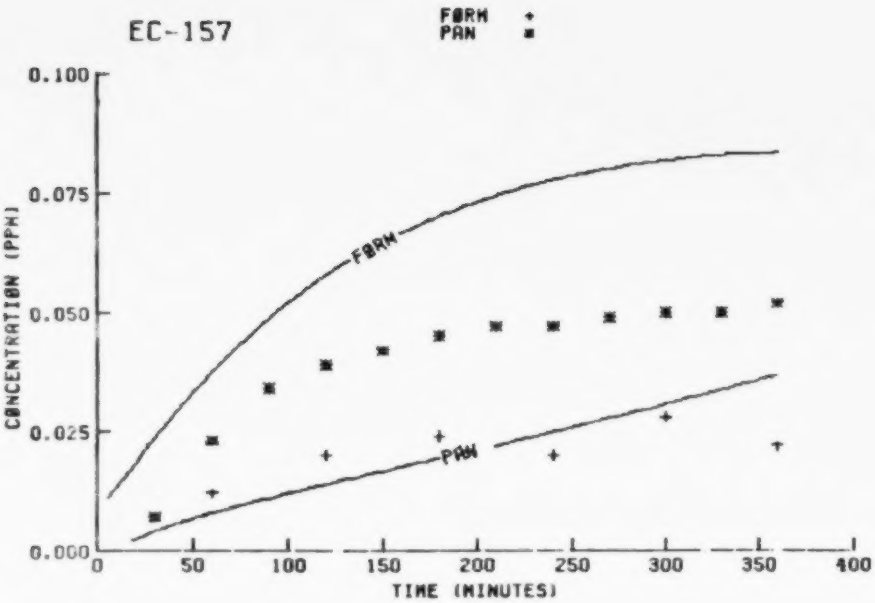

EC-147
ALD2 +
BUT2 ■
0.56
0.42
0.28
0.14
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
BUT2

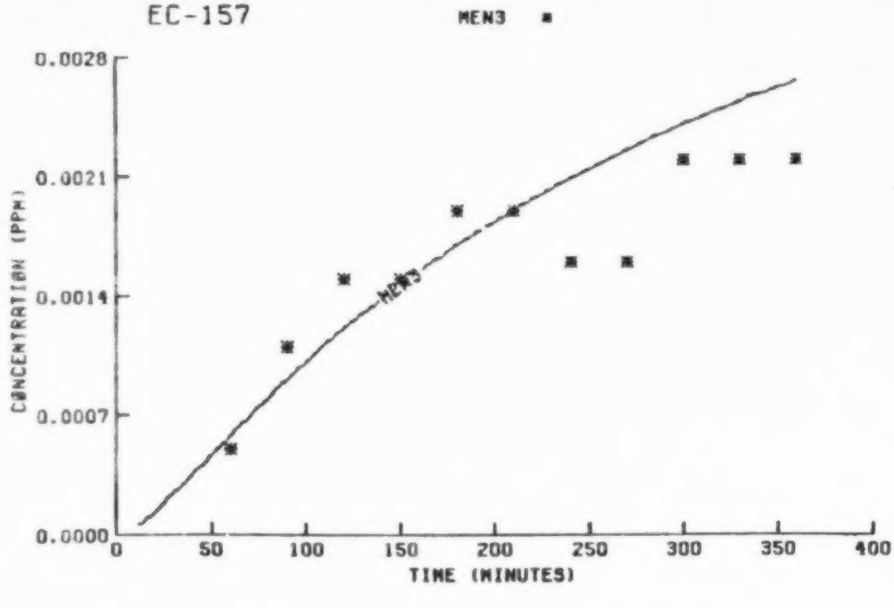

EC-147
FORM +
PAN ■
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PAN


EC-147
MEN3 ＊
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3

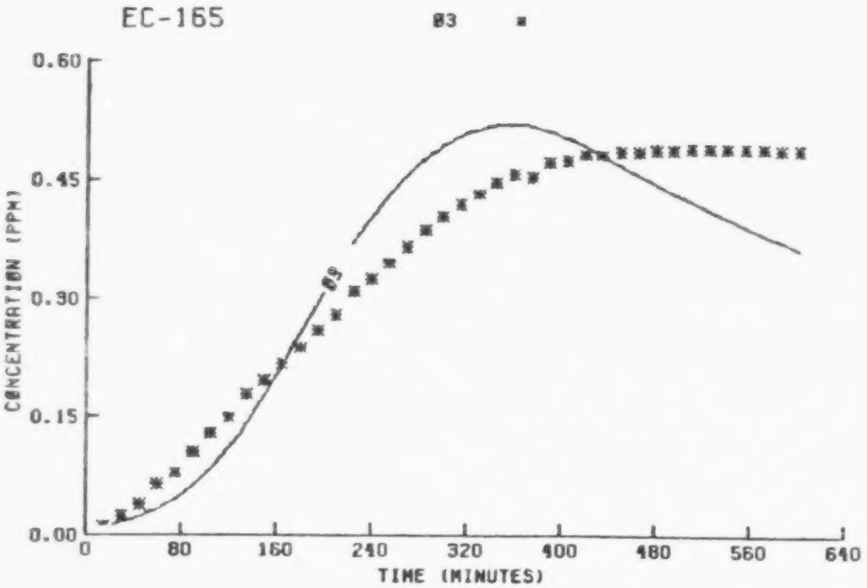

EC-157
NO2 ×
NO +
O3 ✱
0.44
0.33
0.22
0.11
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3

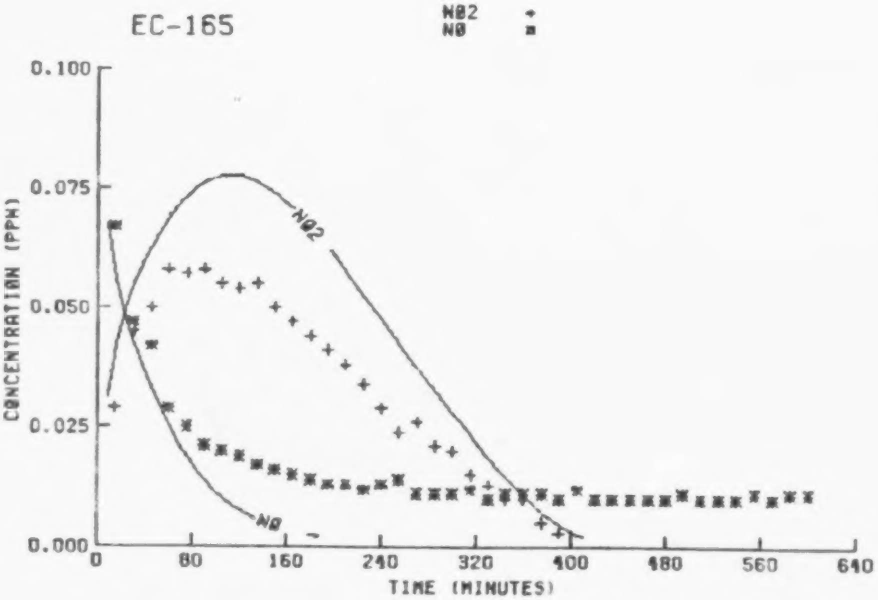

EC-157
ALD2 +
BUT2 ✱
0.28
0.21
0.14
0.07
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
BUT2

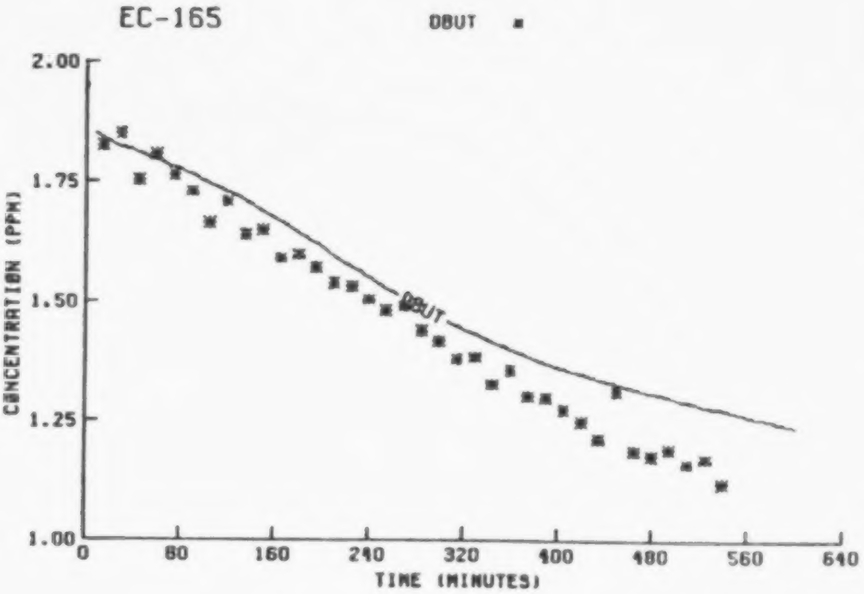

EC-157
FØRM +
PAN ✱
0.100
0.075
0.050
0.025
0.000
CØNCENTRATIØN (PPM)
FØRM
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

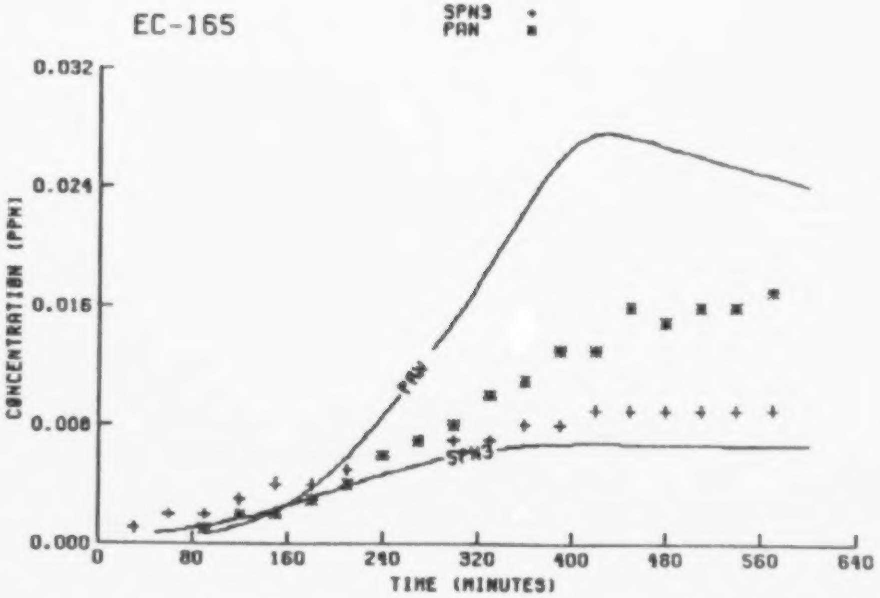

EC-157
MEN3 ✱
0.0028
0.0021
0.0014
0.0007
0.0000
CØNCENTRATIØN (PPM)
MEN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

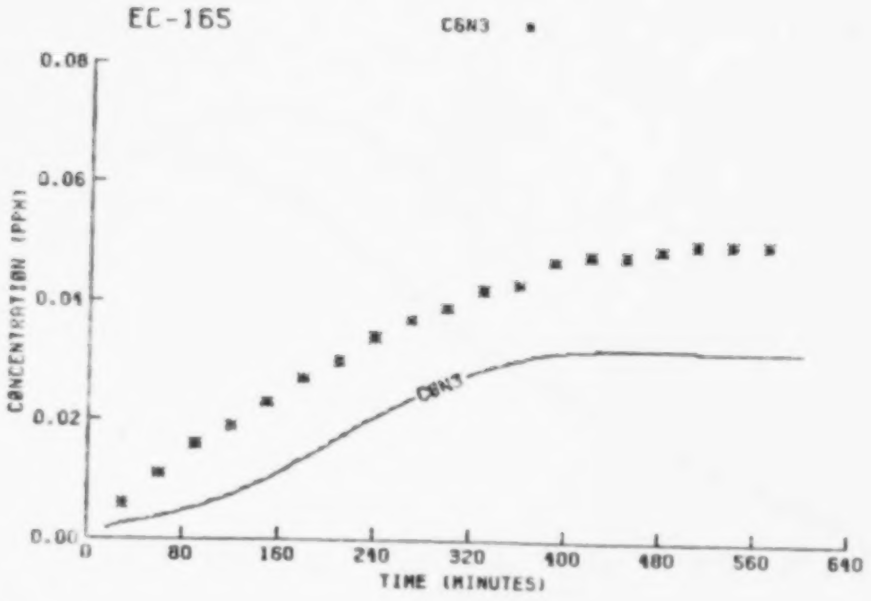
UCR 2,3-DIMETHYLBUTANE EXPERIMENTS

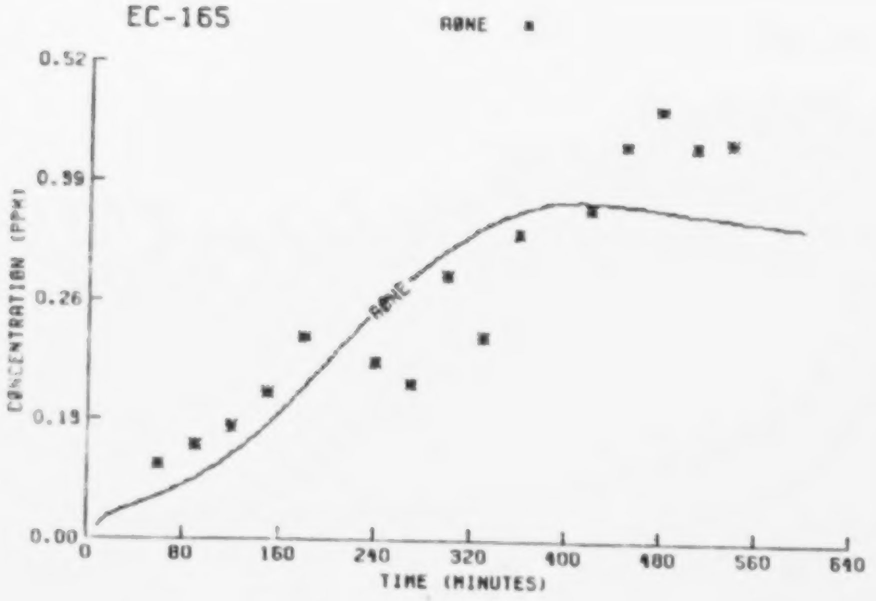

EC-165
O3 ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
O3
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

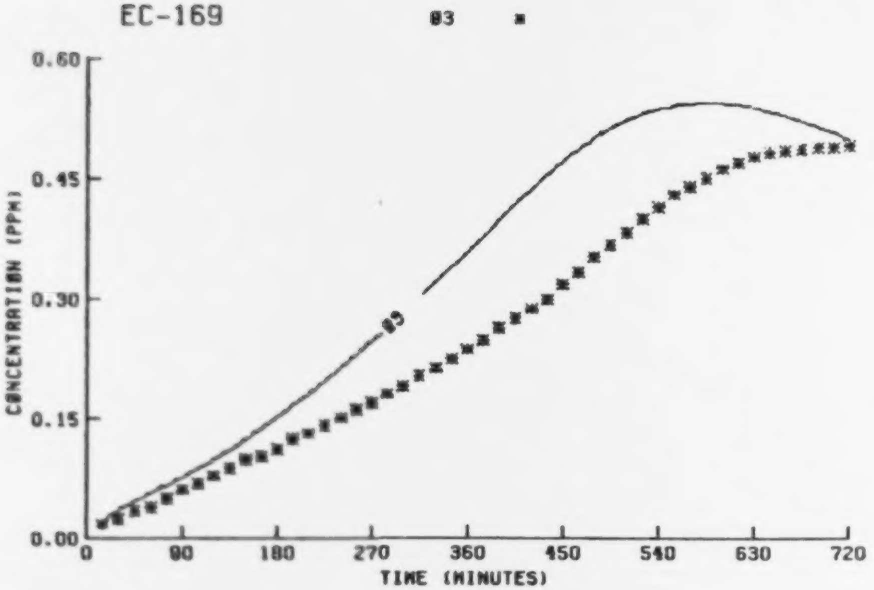

EC-165
NO2 +
NO ✱
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
NO2
NO
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

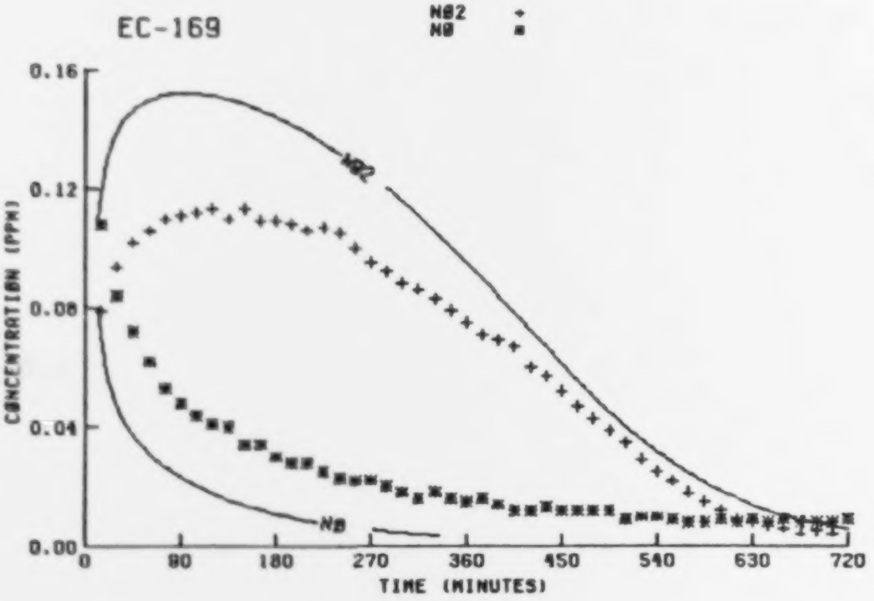

EC-165
OBUT ✱
2.00
1.75
1.50
1.25
1.00
CONCENTRATION (PPM)
0
80
160
240
320
400
480
560
640
TIME (MINUTES)
OBUT

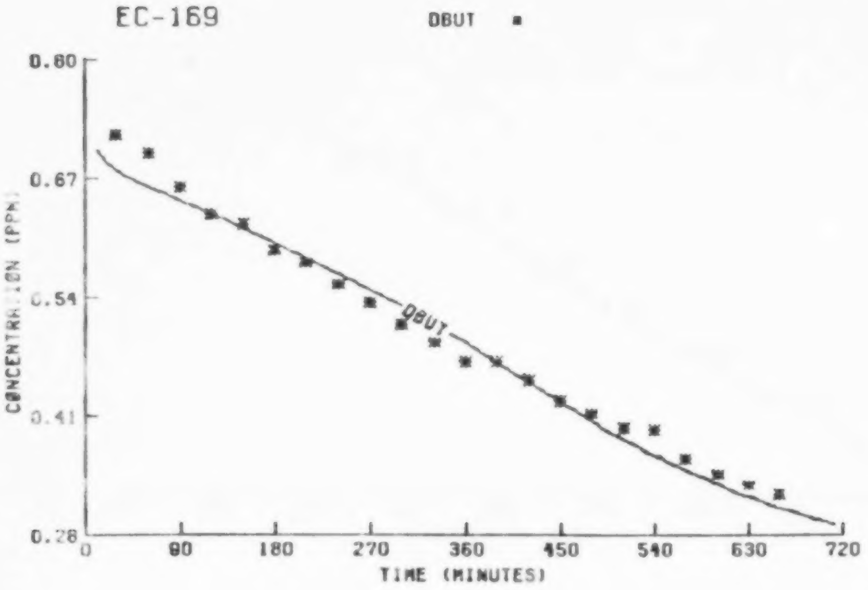

EC-165
SPN3 +
PAN ✱
0.032
0.024
0.016
0.008
0.000
CONCENTRATION (PPM)
0
80
160
240
320
400
480
560
640
TIME (MINUTES)
PAN
SPN3

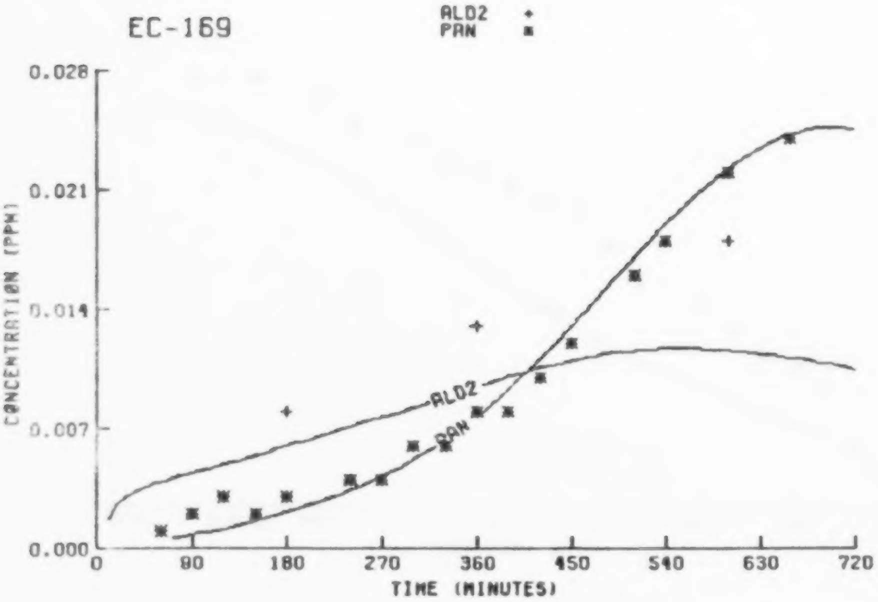

EC-165
C6N3 ✱
0.08
0.06
0.04
0.02
0.00
CONCENTRATION (PPM)
C6N3
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

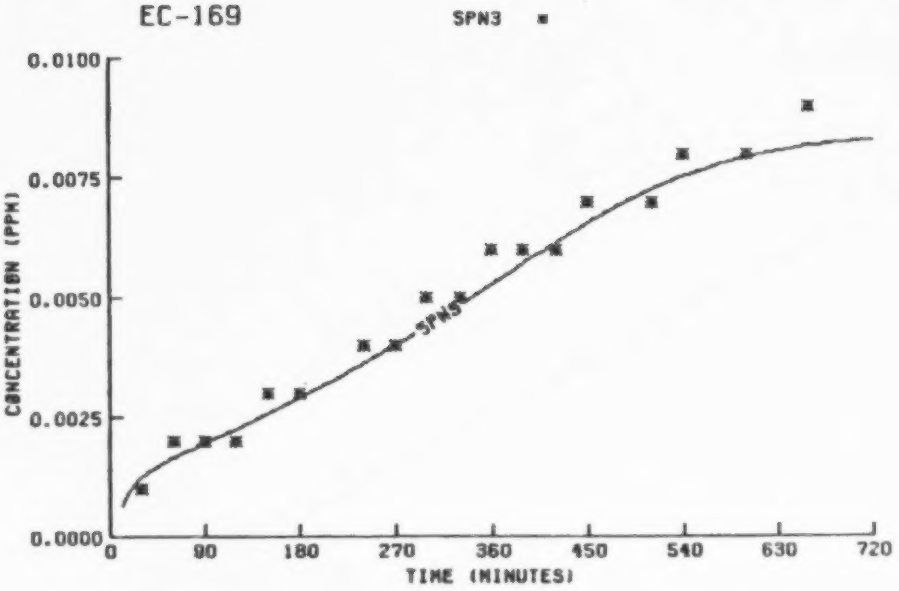

EC-165
RONE ✱
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
RONE
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

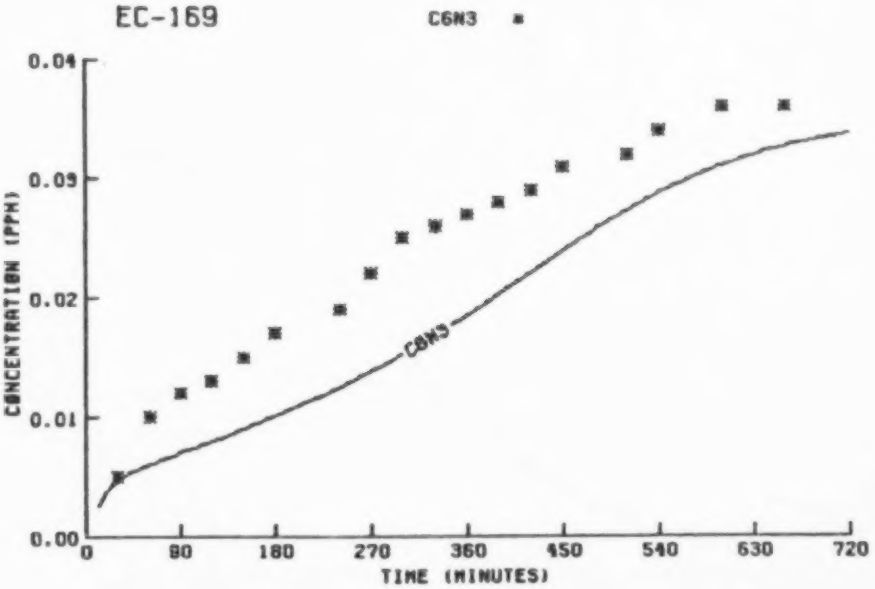

EC-169
O3 *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
O3
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

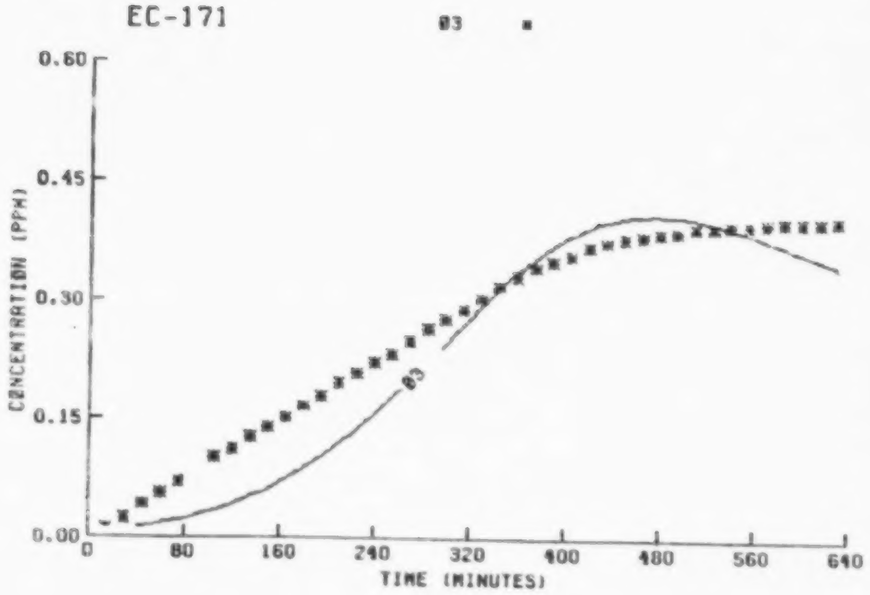

EC-169
NO2 +
NO *
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
NO2
NO
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

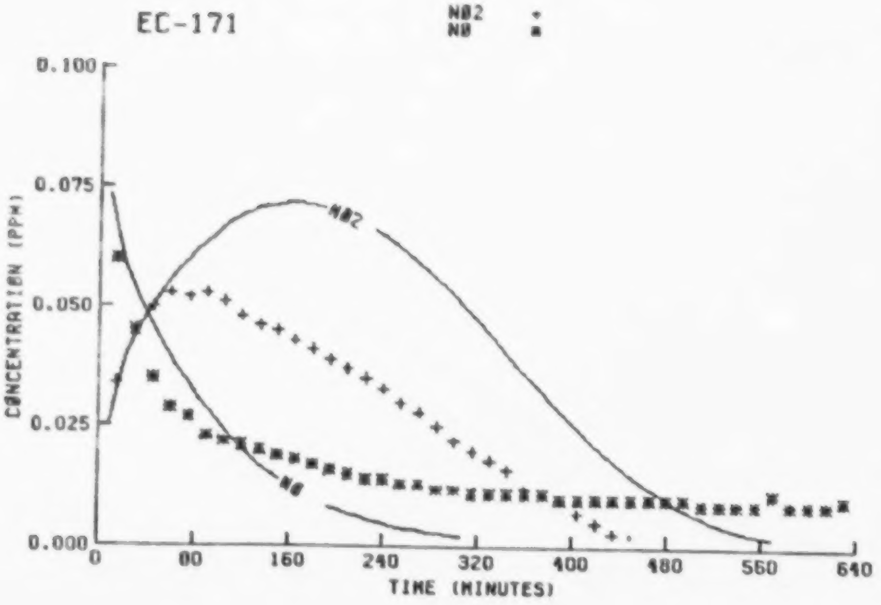

EC-169
OBUT ■
0.80
0.67
0.54
0.41
0.28
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
OBUT

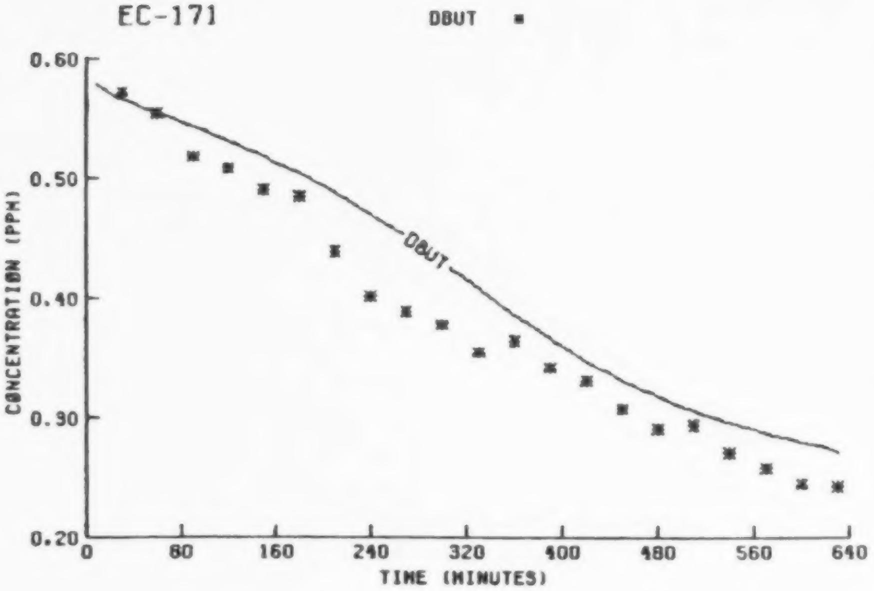

EC-169
ALD2 +
PAN ■
0.028
0.021
0.014
0.007
0.000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
ALD2
PAN

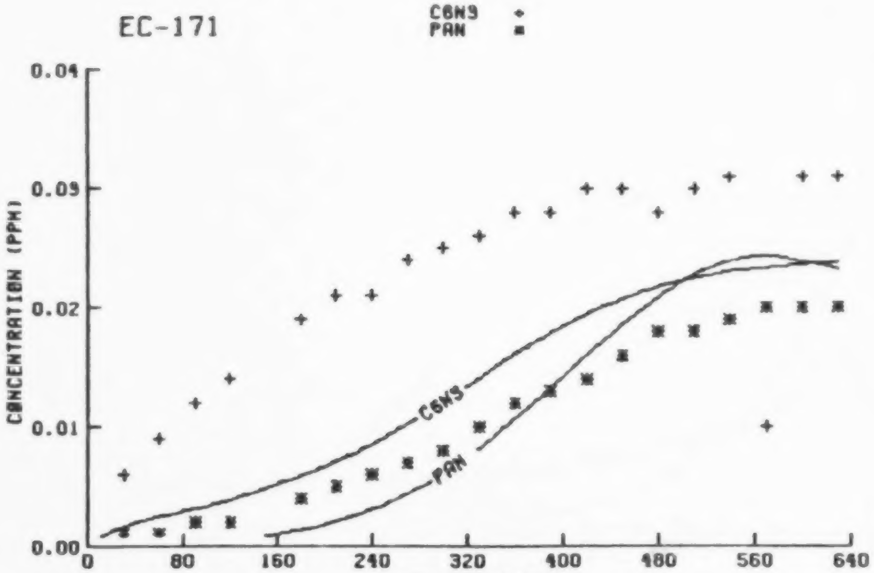

EC-169
SPN3 ■
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
SPN3

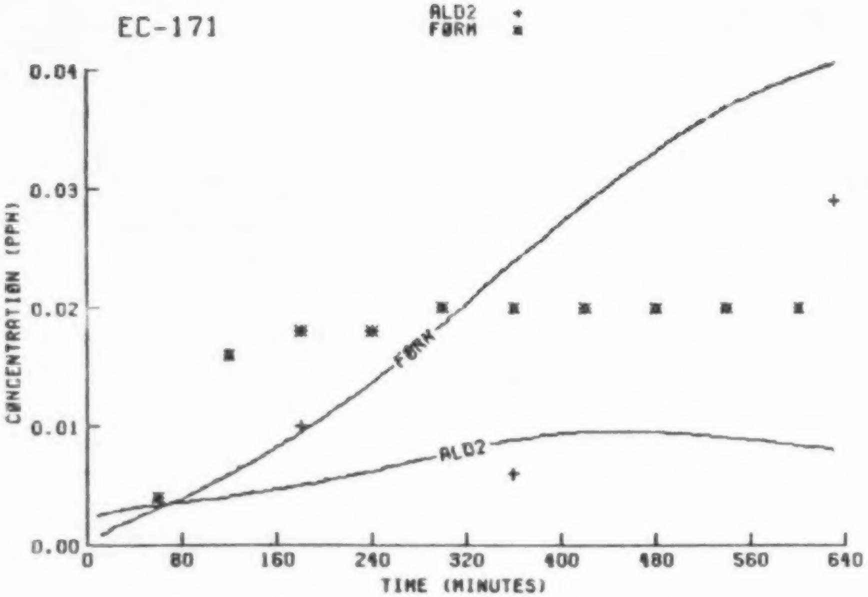

EC-169
C6N3 ■
0.04
0.03
0.02
0.01
0.00
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
C6N3

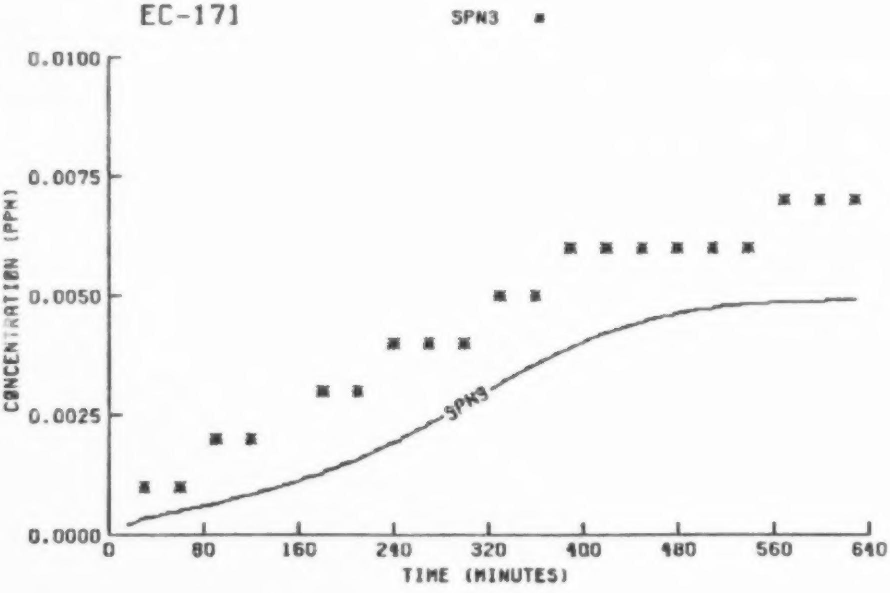

EC-171
O3 ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
O3
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

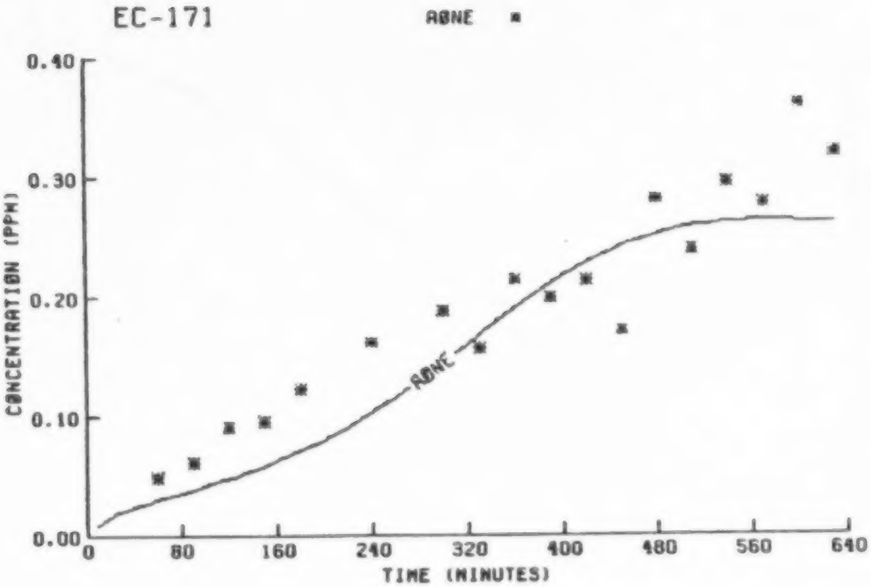

EC-171
NO2 +
NO ✱
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
NO2
NO
0
80
160
240
320
400
480
560
640
TIME (MINUTES)


EC-171
DBUT ✱
0.60
0.50
0.40
0.30
0.20
CONCENTRATION (PPM)
DBUT
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

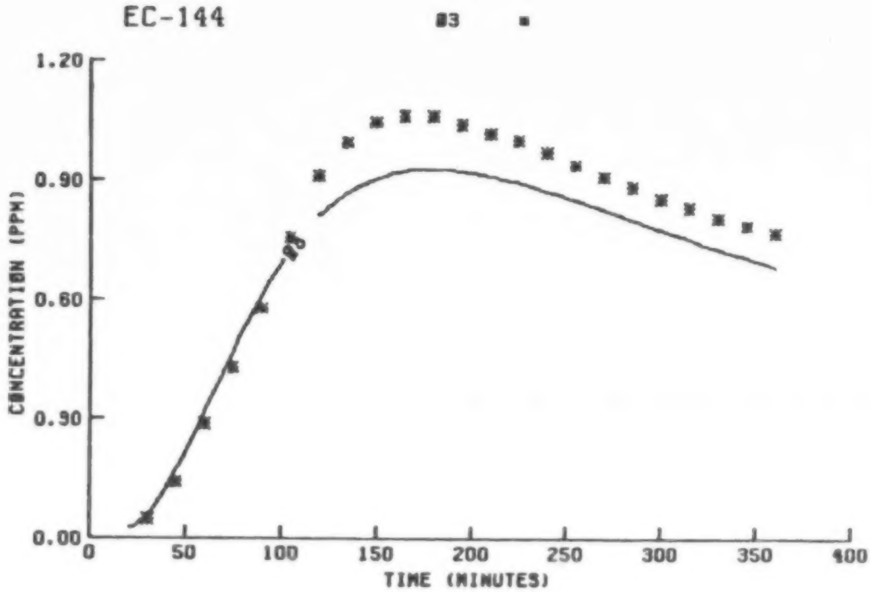

EC-171
C6N3 +
PAN ✱
0.04
0.03
0.02
0.01
0.00
CONCENTRATION (PPM)
C6N3
PAN
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

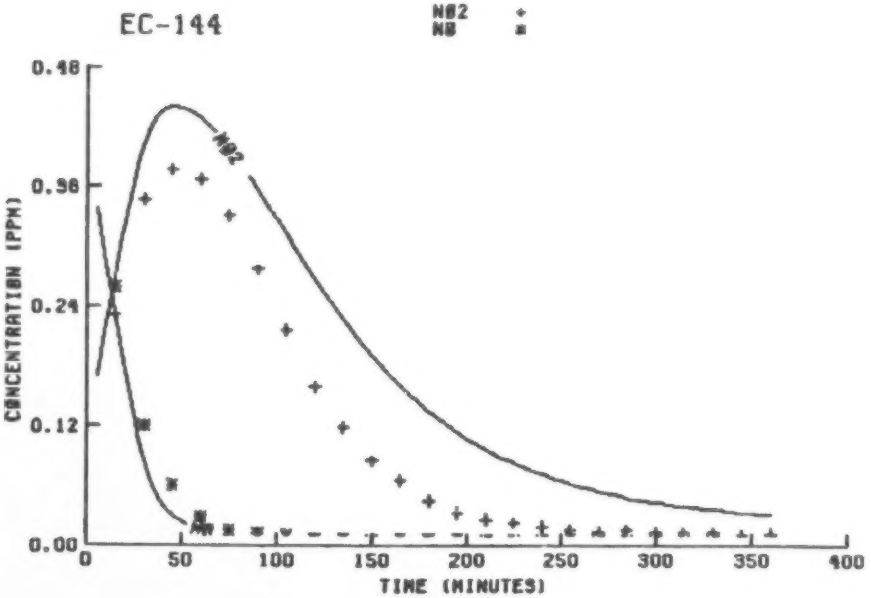

EC-171
ALD2 +
FØRM ✱
0.04
0.03
0.02
0.01
0.00
CØNCENTRATIØN (PPM)
0
80
160
240
320
400
480
560
640
TIME (MINUTES)
FØRM
ALD2

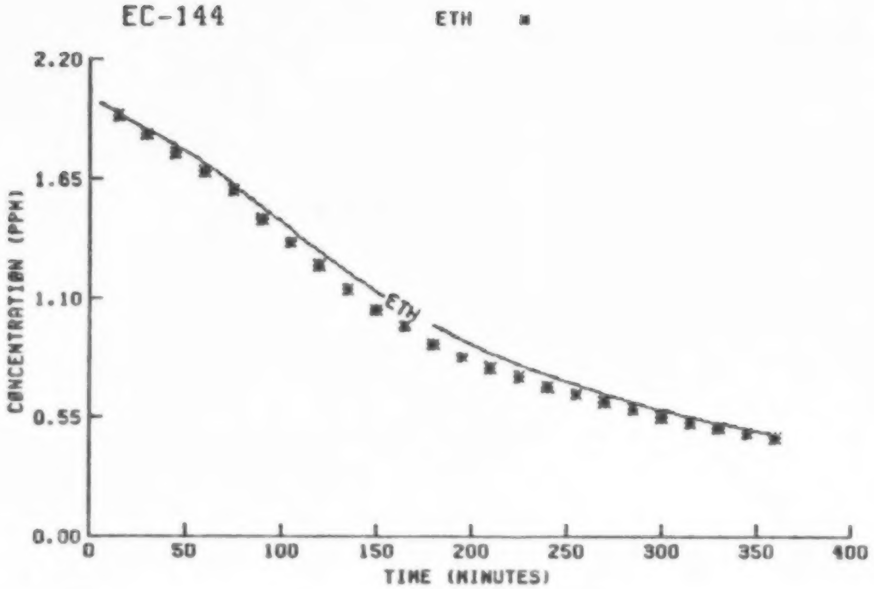

EC-171
SPN3 ✱
0.0100
0.0075
0.0050
0.0025
0.0000
CØNCENTRATIØN (PPM)
0
80
160
240
320
400
480
560
640
TIME (MINUTES)
SPN3

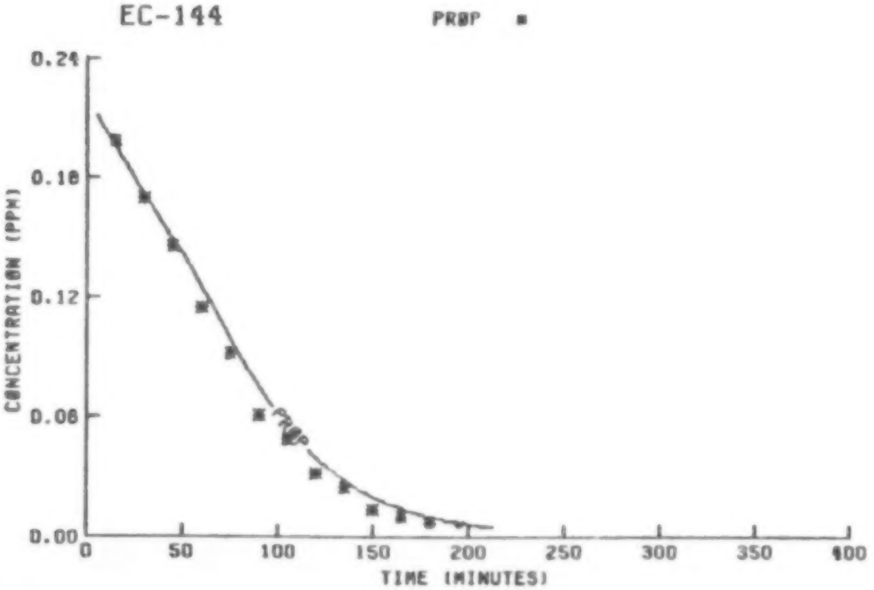

EC-171
AONE *
CONCENTRATION (PPM)
0.40
0.30
0.20
0.10
0.00
0
80
160
240
320
400
480
560
640
TIME (MINUTES)
AONE

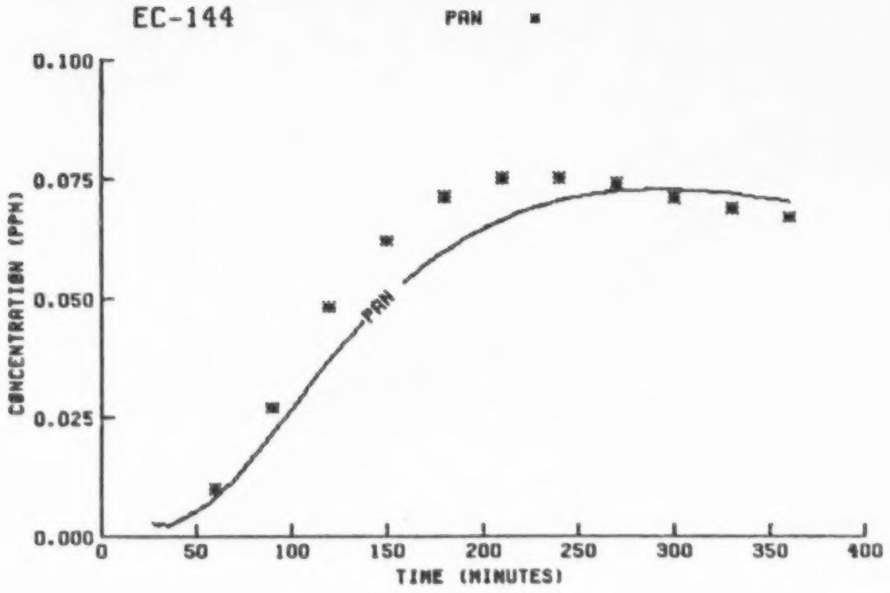
UCR ETHYLENE/PROPYLENE EXPERIMENTS

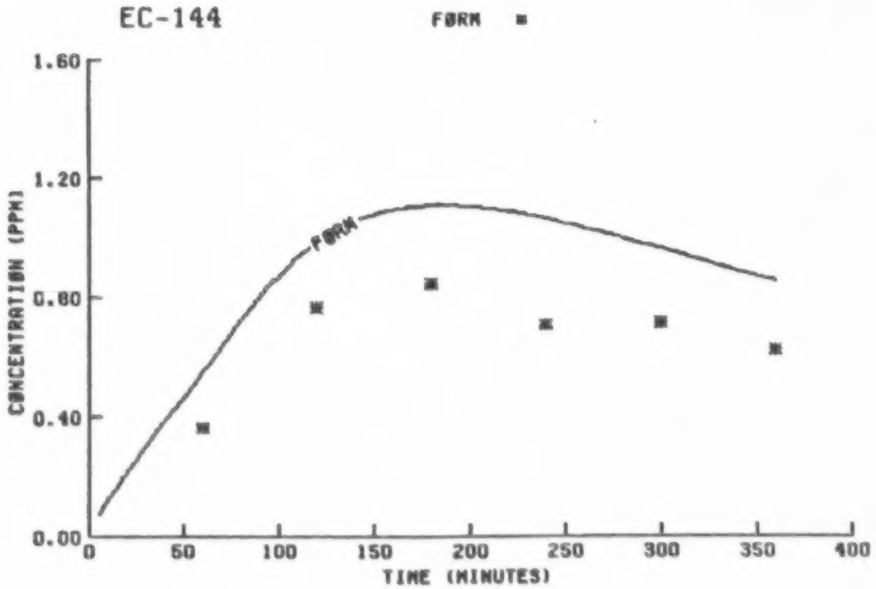

EC-144
O3 ■
O3
CONCENTRATION (PPM)
1.20
0.90
0.60
0.30
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

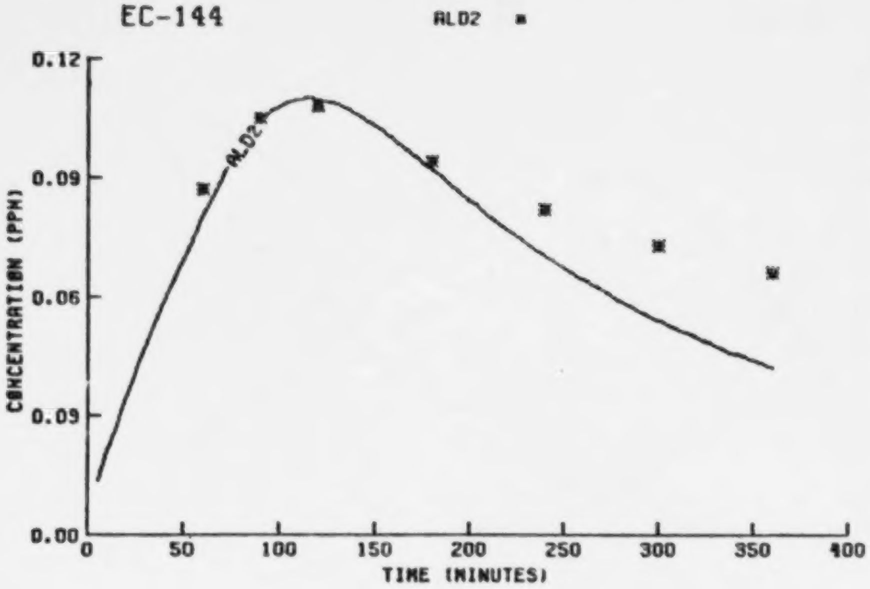

EC-144
NO2 +
NO ■
NO2
CONCENTRATION (PPM)
0.48
0.36
0.24
0.12
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

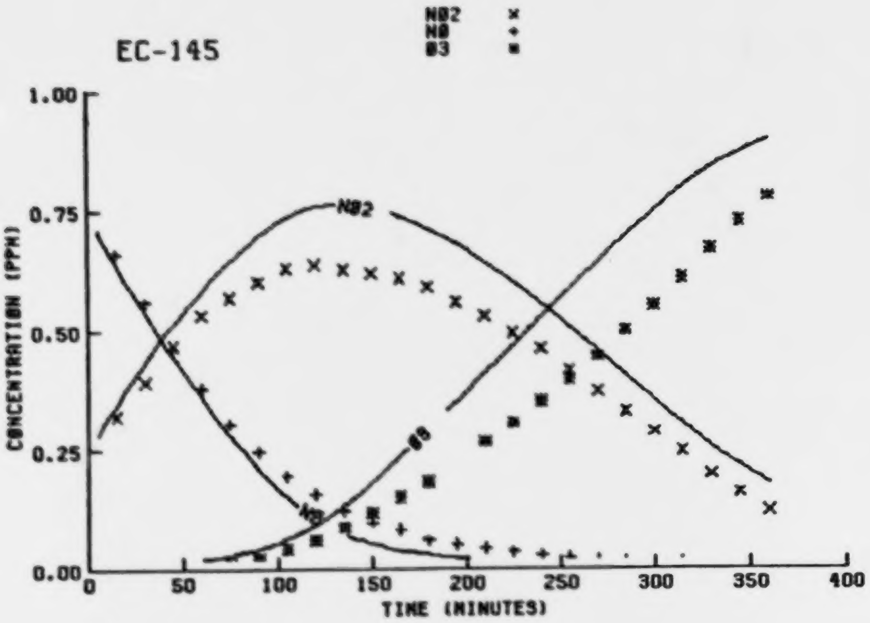

EC-144
ETH
2.20
1.65
1.10
0.55
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

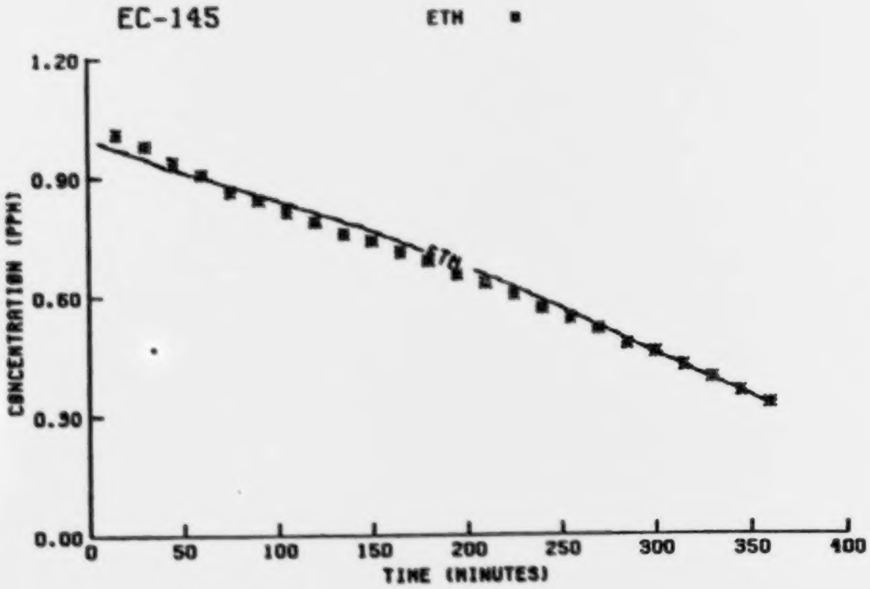

EC-144
PROP
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PROP

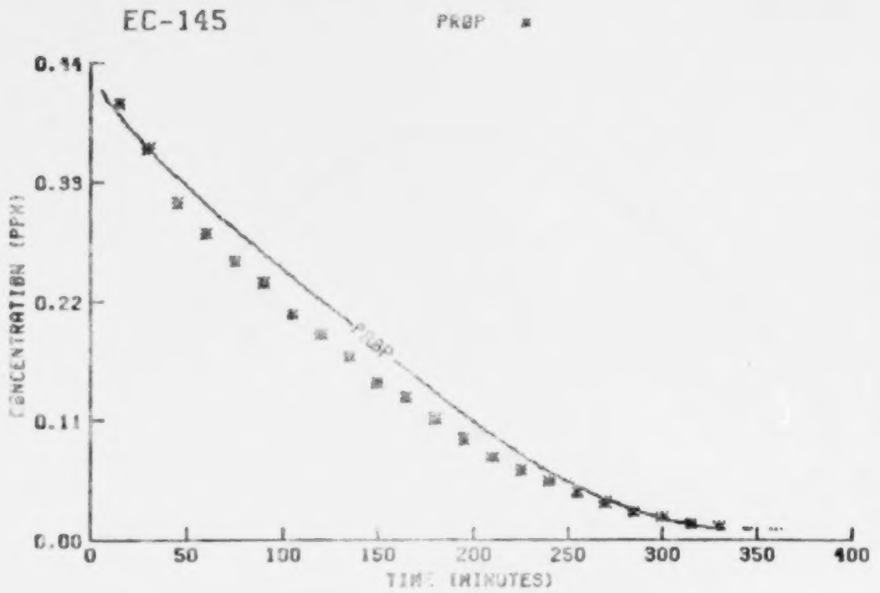

EC-144
PAN ■
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

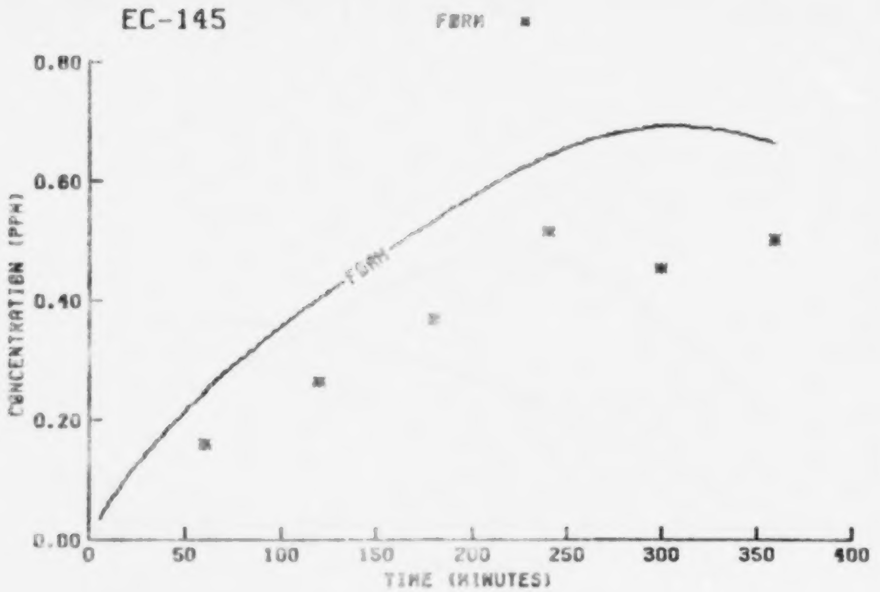

EC-144
FORM ■
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM

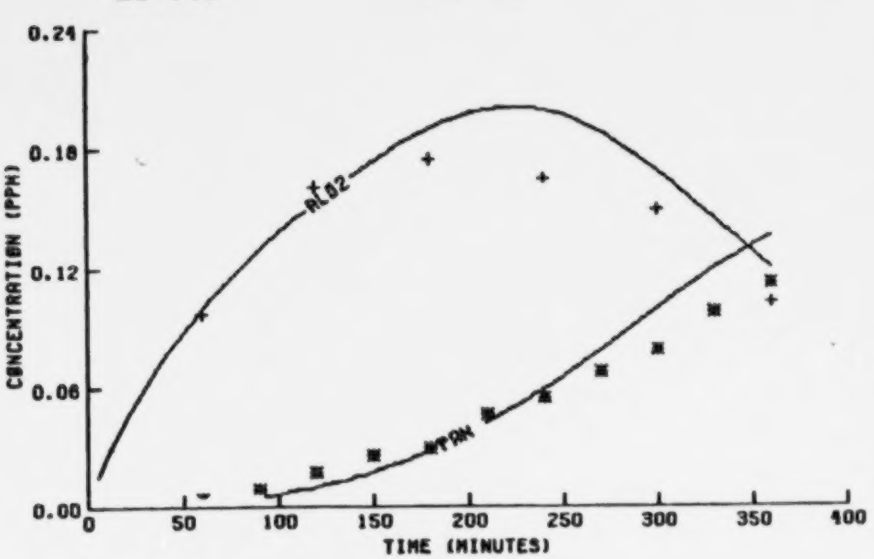

EC-144
ALD2
0.12
0.09
0.06
0.09
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

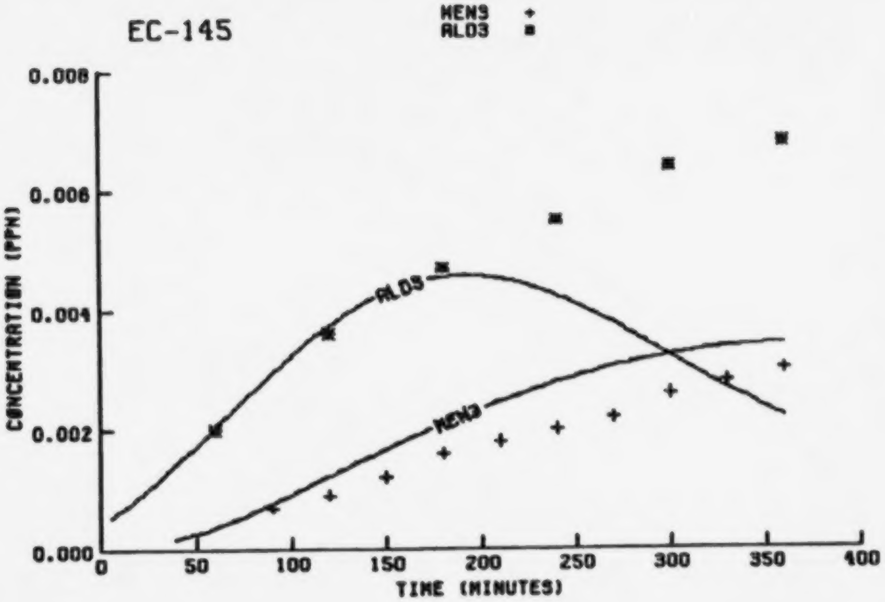

EC-145
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
1.00
0.75
0.50
0.25
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3

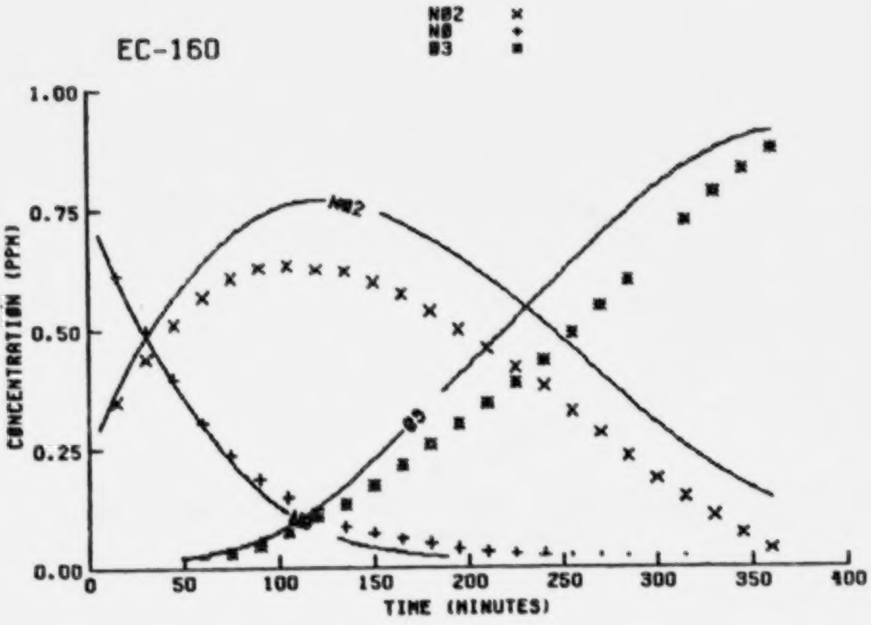

EC-145
ETH ✱
CONCENTRATION (PPM)
1.20
0.90
0.60
0.30
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

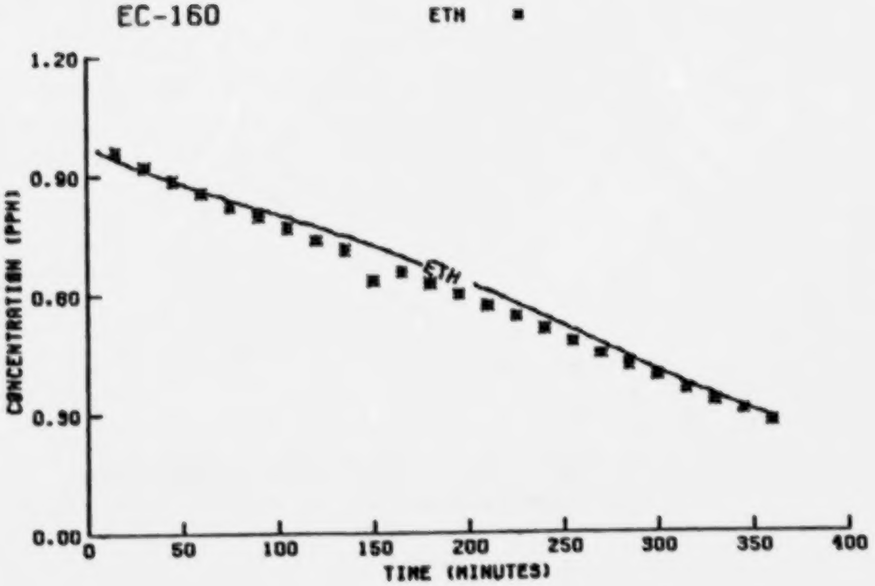

EC-145
PROP *
0.44
0.33
0.22
0.11
0.00
CONCENTRATION (PPM)
PROP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

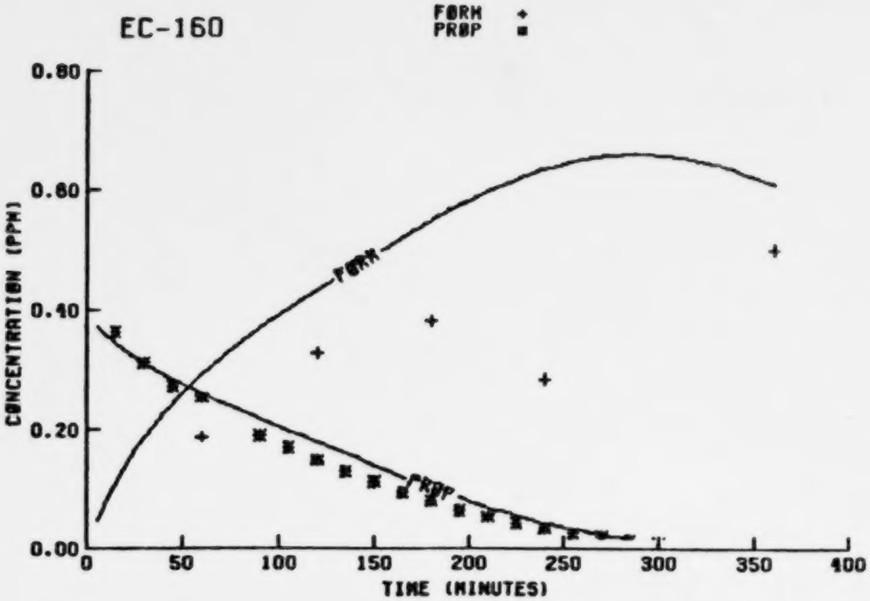

EC-145
FORM *
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

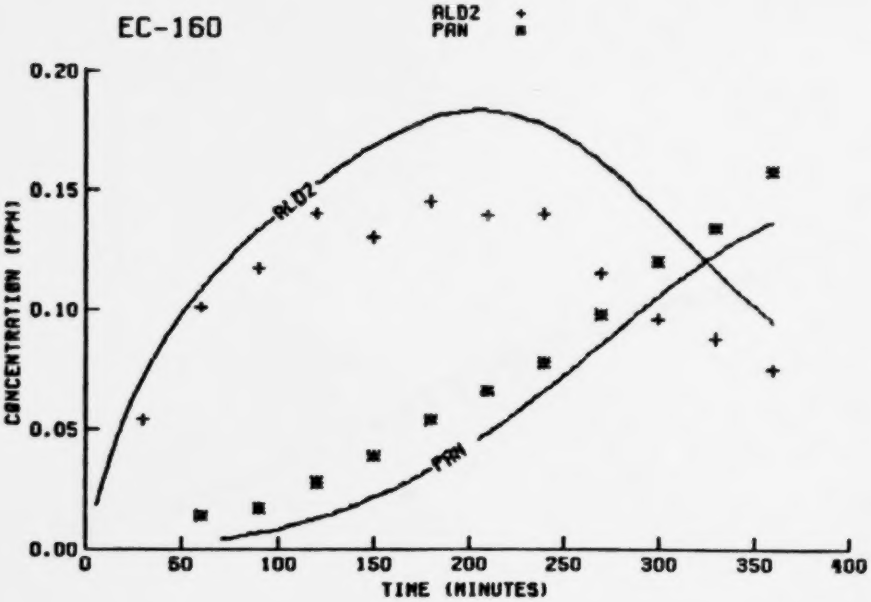

EC-145
ALD2 +
PAN ▪
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

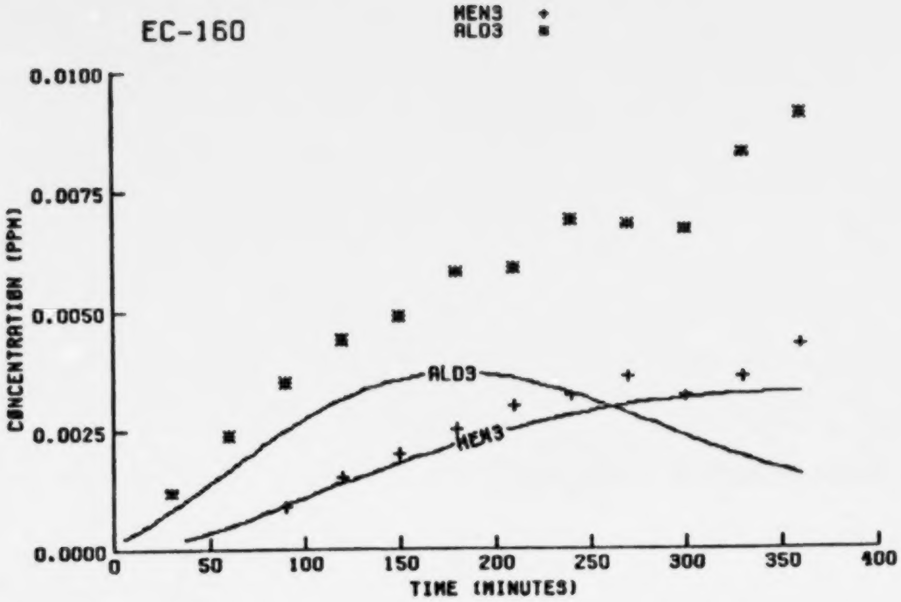

EC-145
MEN3 +
ALD3 ▪
0.008
0.006
0.004
0.002
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3
MEN3


EC-160
NO2 ×
NO +
O3 ■
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
O3
NO

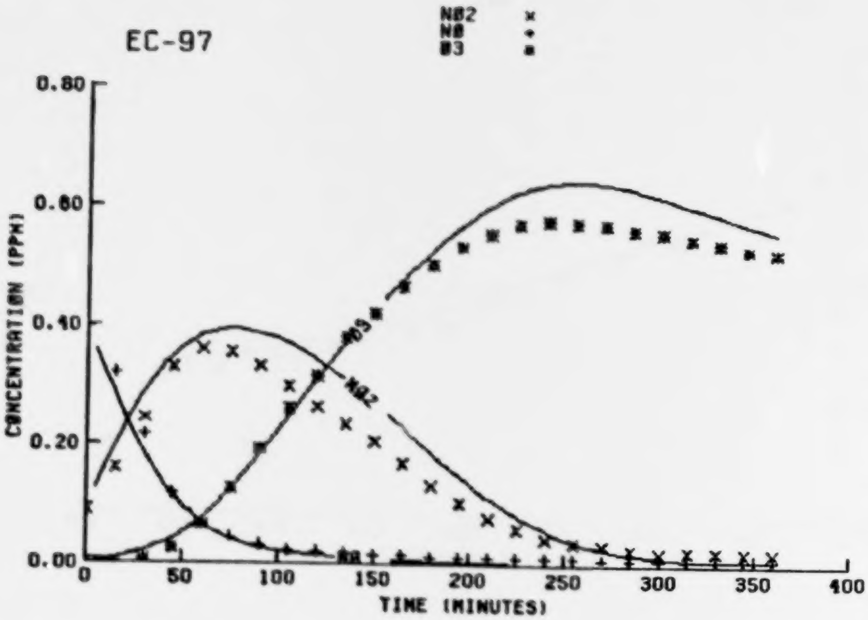

EC-160
ETH ■
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

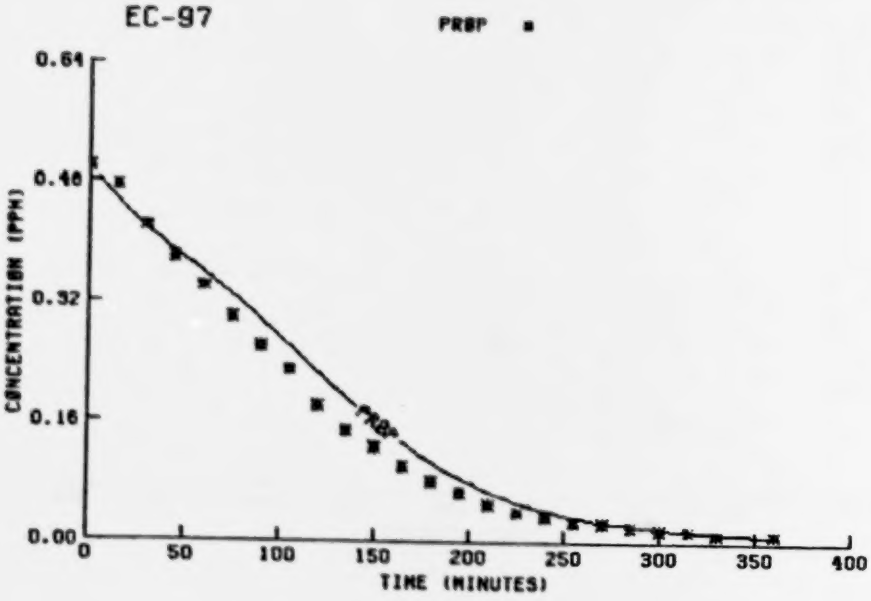

EC-160
FORM +
PROP ▪
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PROP

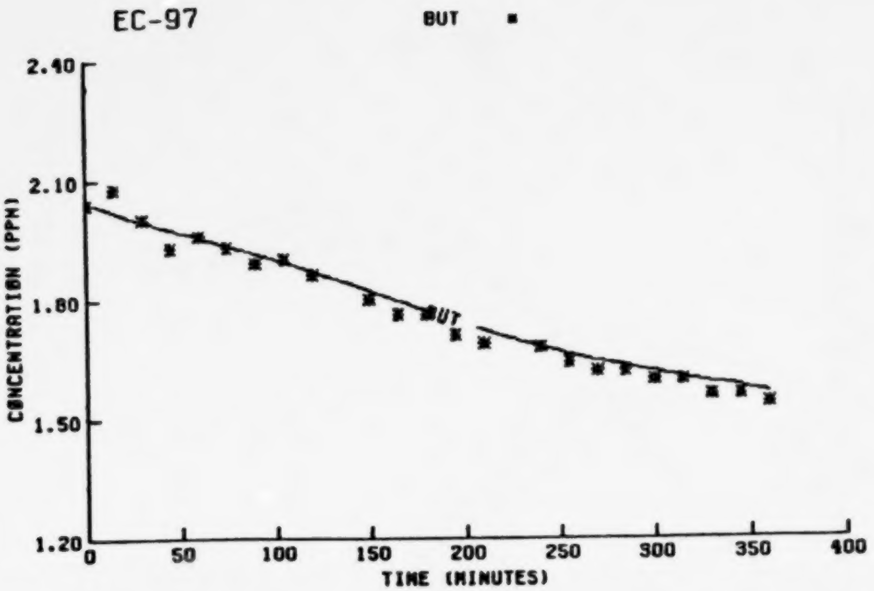

EC-160
ALD2 +
PAN ▪
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN

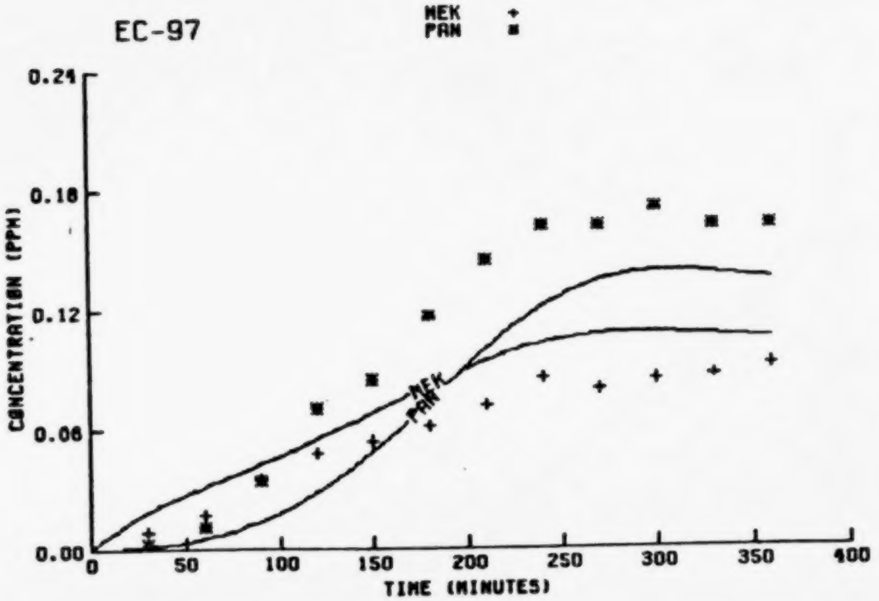

EC-160
MEN3 +
ALD3 ✱
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3
MEN3

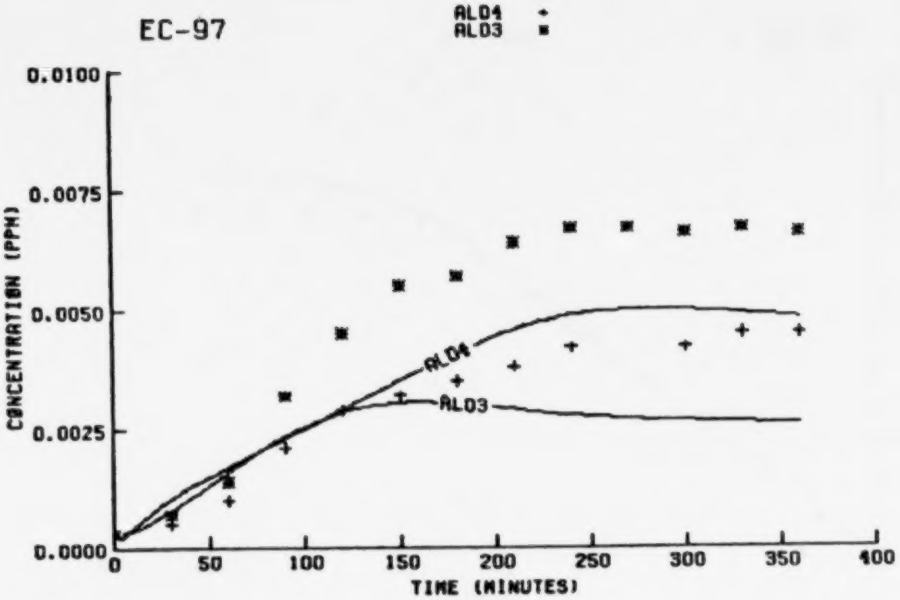
UCR PROPYLENE/BUTANE EXPERIMENTS

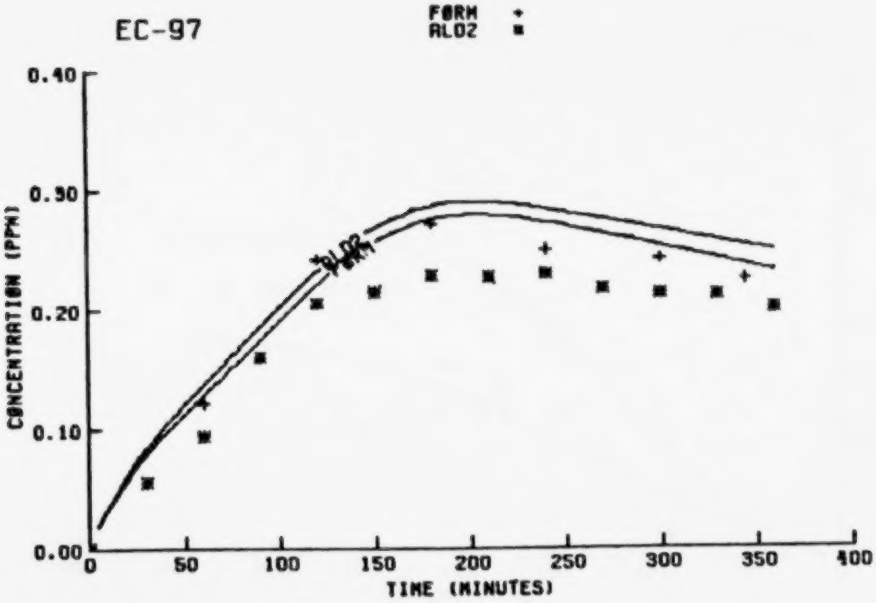

EC-97
NØ2 ×
NØ +
Ø3 ■
CONCENTRATIØN (PPM)
0.80
0.60
0.40
0.20
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
Ø3
NØ2
NØ

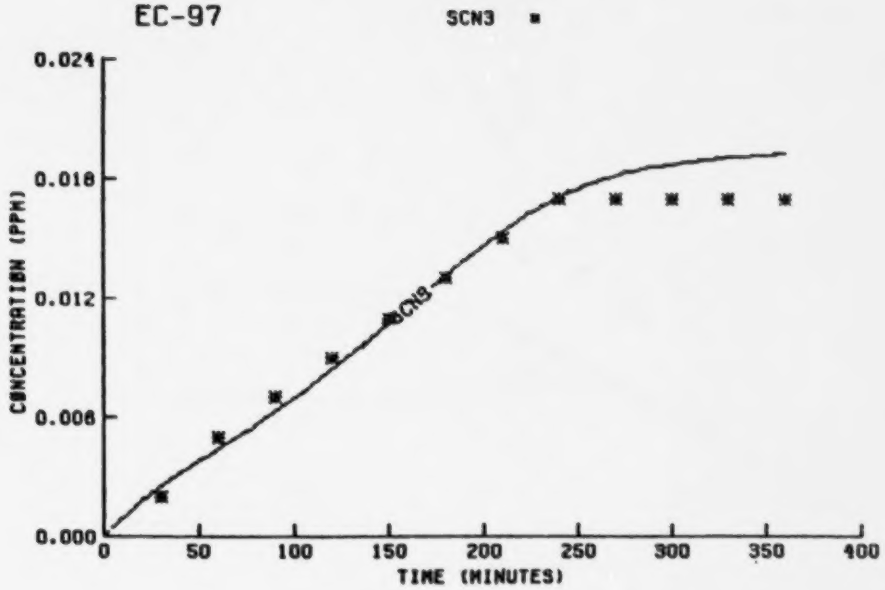

EC-97
PRØP ■
CONCENTRATIØN (PPM)
0.64
0.48
0.32
0.16
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
PRØP

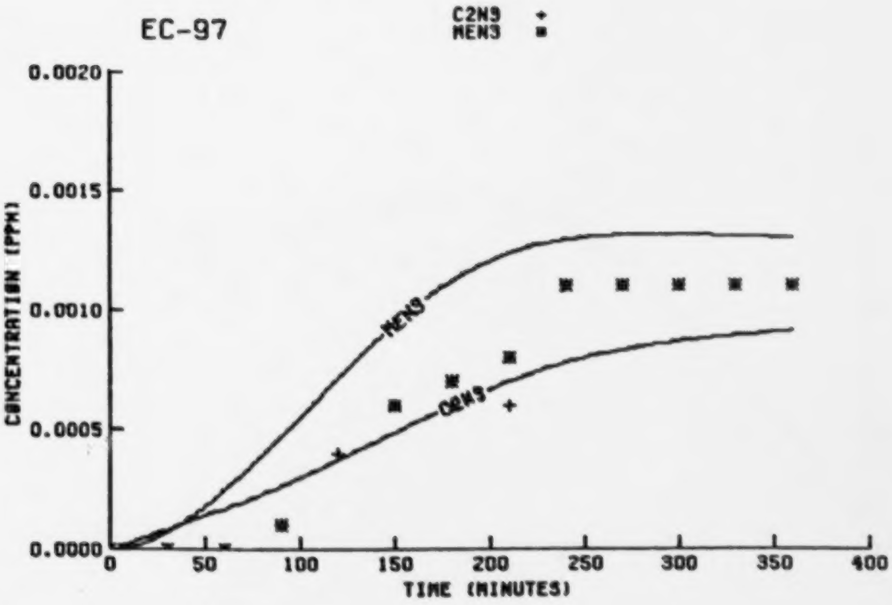

EC-97
BUT ✱
2.40
2.10
1.80
1.50
1.20
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

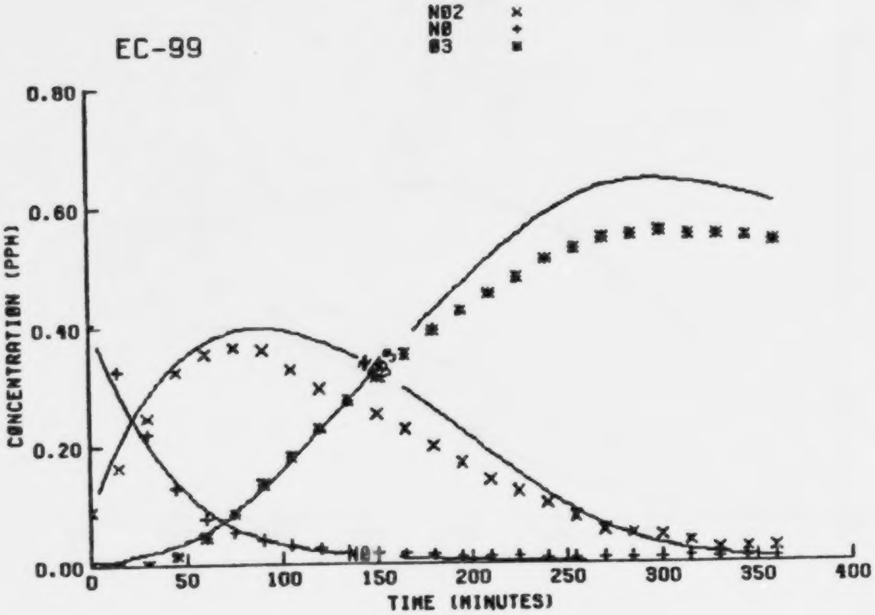

EC-97
MEK +
PAN ✱
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEK
PAN

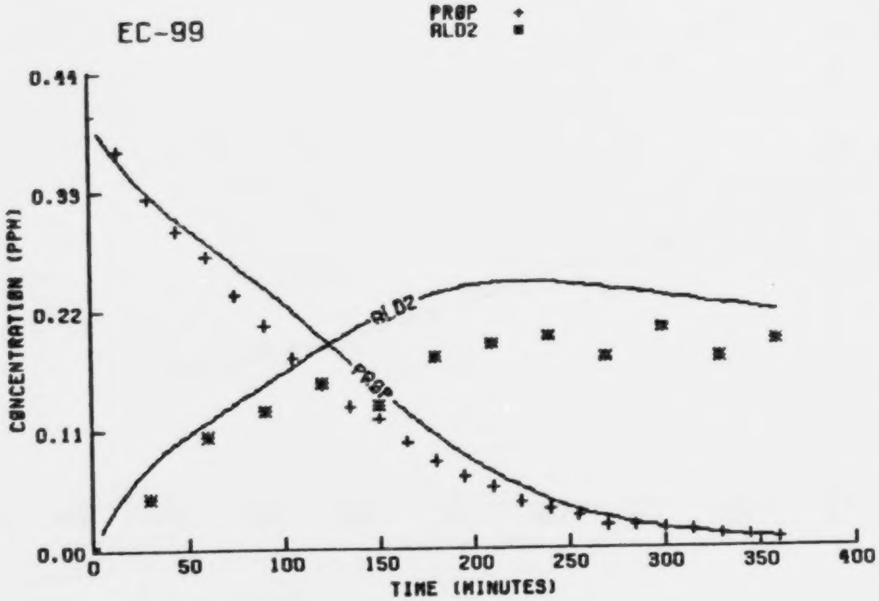

EC-97
ALD4 +
ALD3 ▪
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD4
ALD3

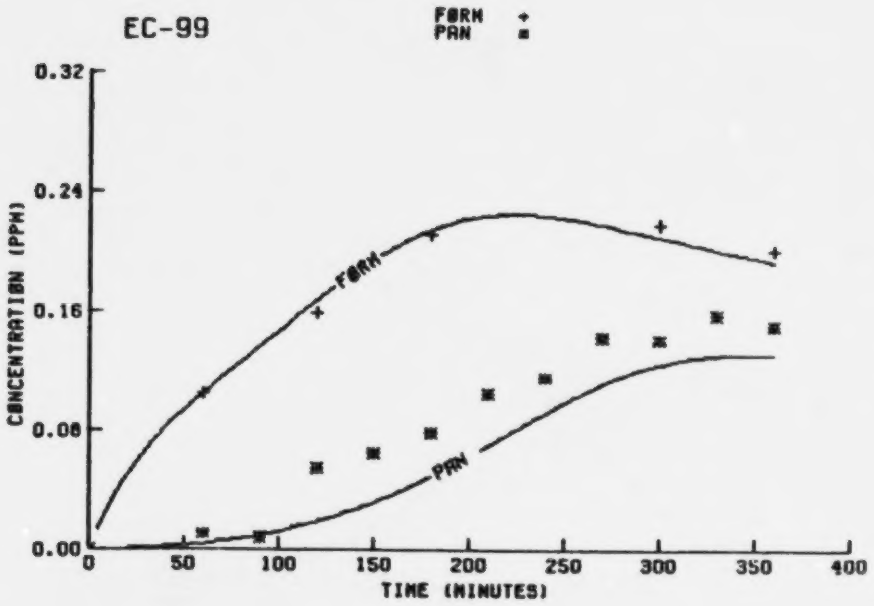

EC-97
FORM +
ALD2 ▪
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
FORM

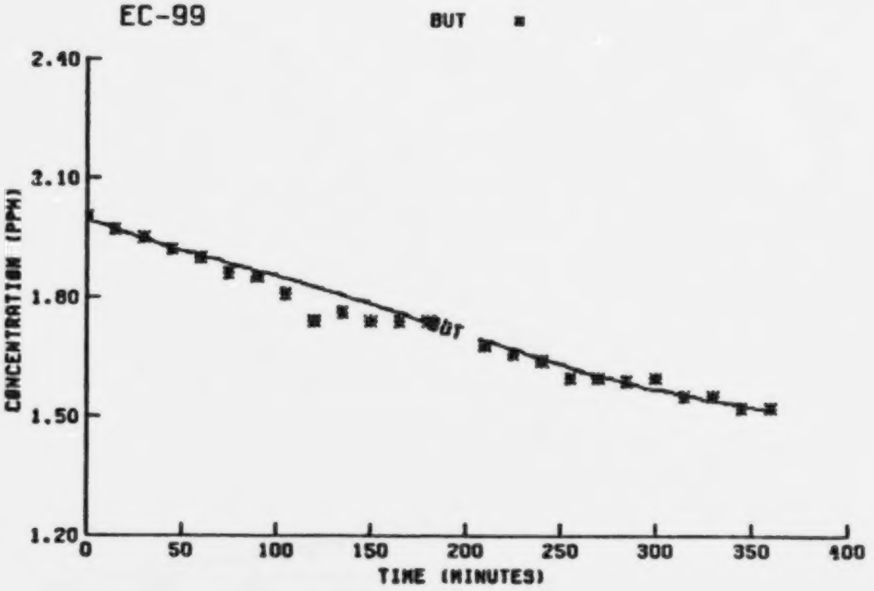

EC-97
SCN3
0.024
0.018
0.012
0.006
0.000
CONCENTRATION (PPM)
SCN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

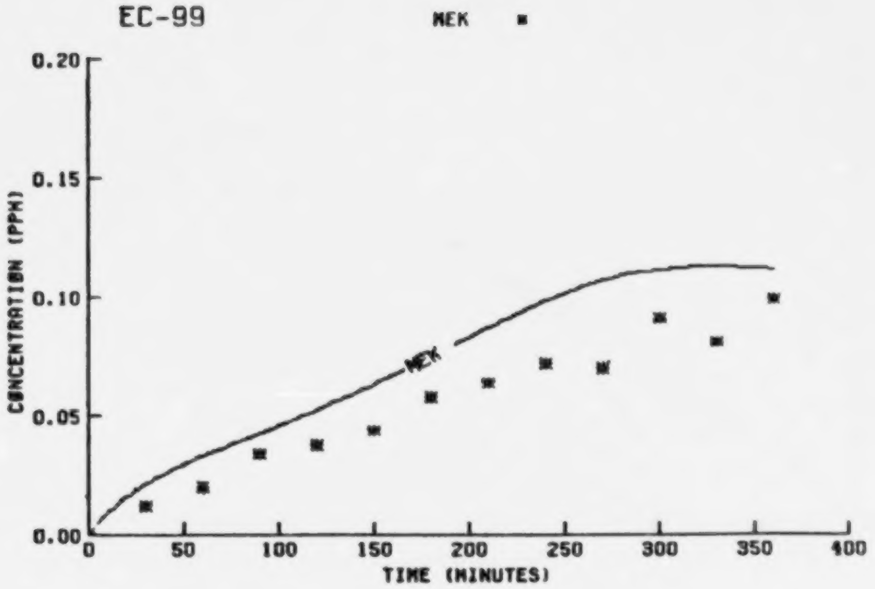

EC-97
C2N3 +
MEN3
0.0020
0.0015
0.0010
0.0005
0.0000
CONCENTRATION (PPM)
MEN3
C2N3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

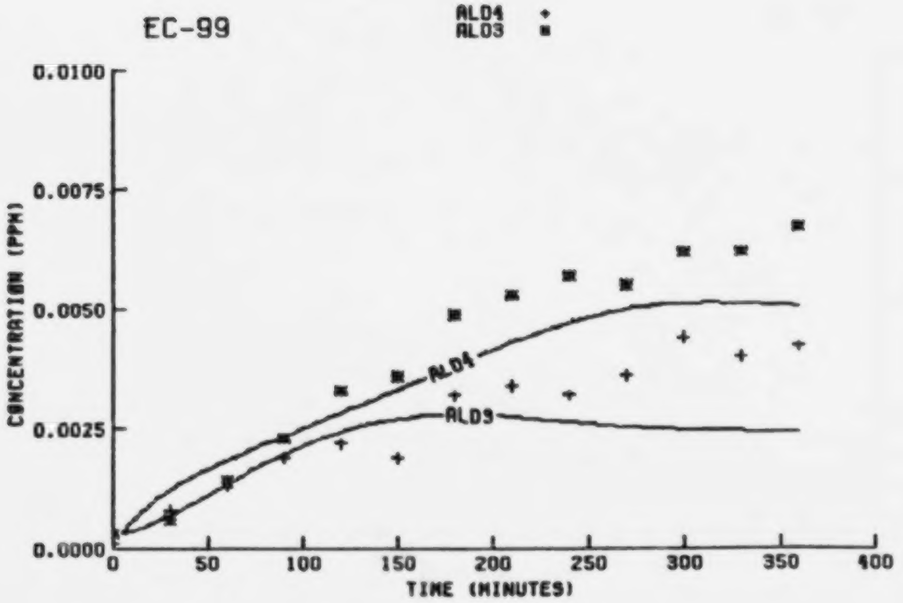

EC-99
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
O3
NO

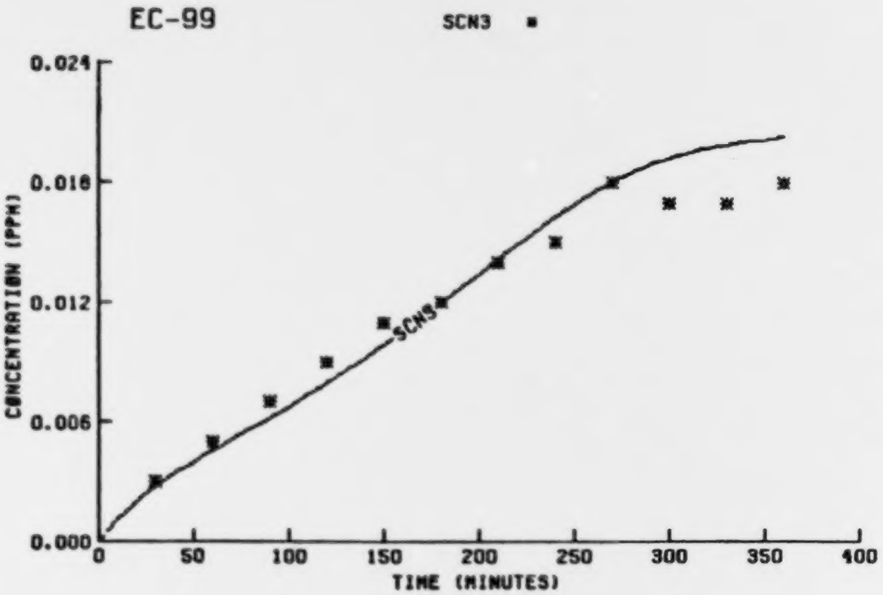

EC-99
PROP +
ALD2 ✱
0.44
0.33
0.22
0.11
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PROP

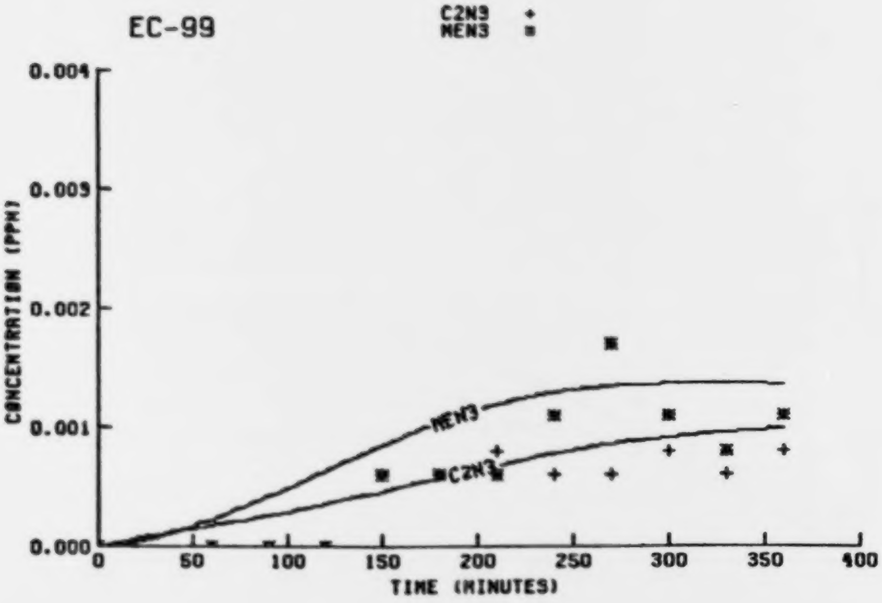

EC-99
FORM +
PAN *
0.32
0.24
0.16
0.08
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
PAN

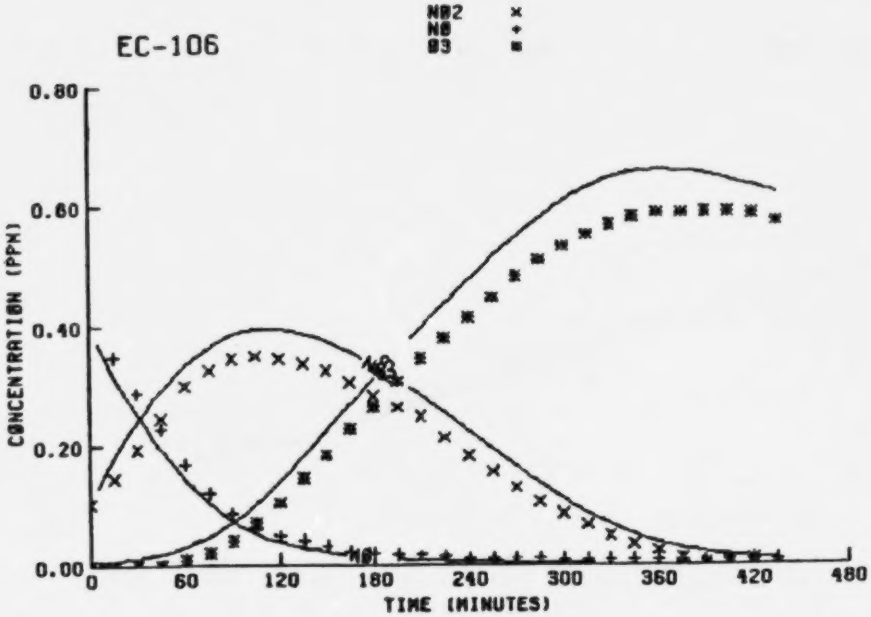

EC-99
BUT *
2.40
2.10
1.80
1.50
1.20
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

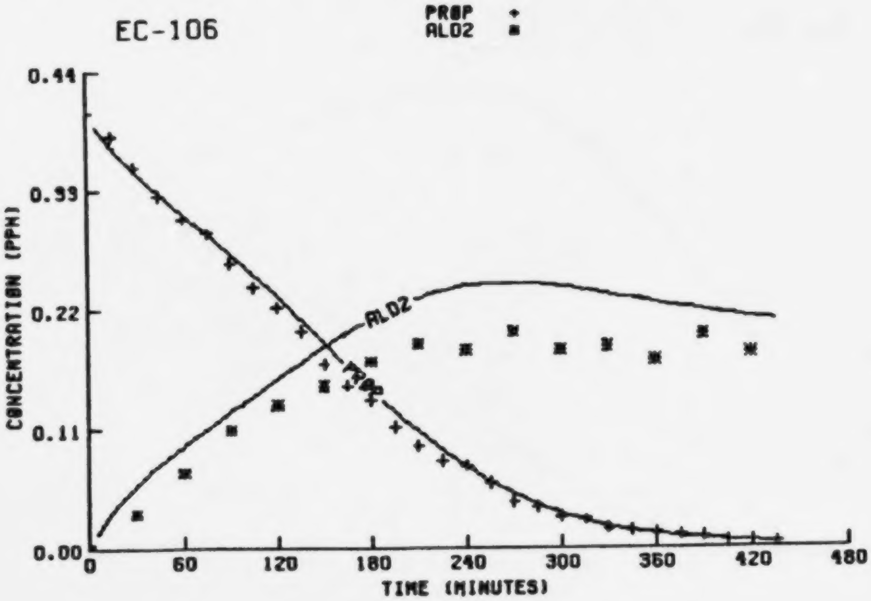

EC-99
MEK
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

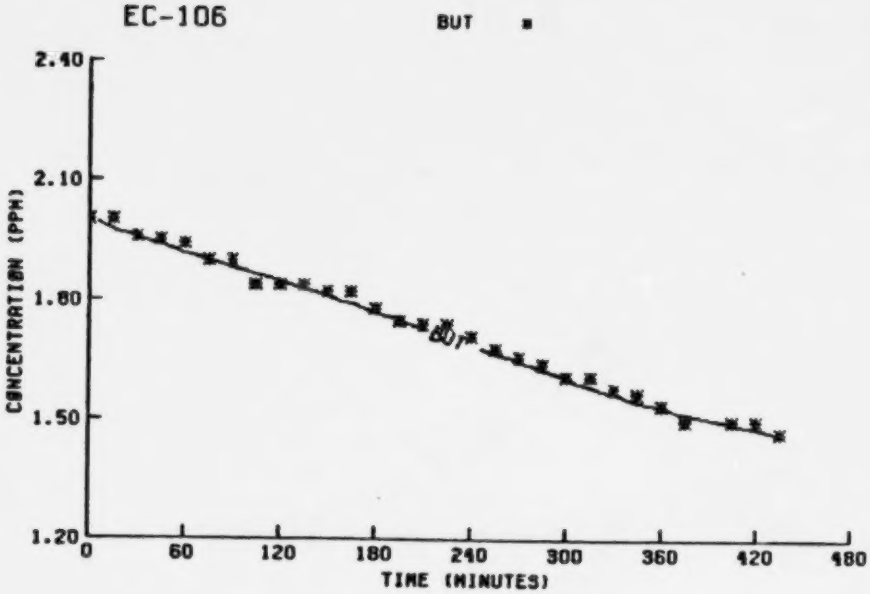

EC-99
ALD4 +
ALD3
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
ALD4
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

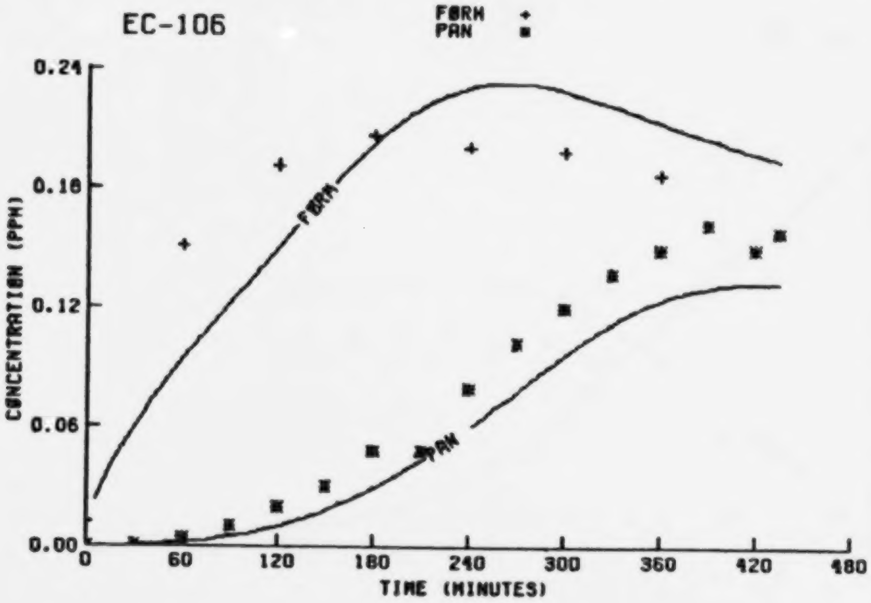

EC-99
SCN3 ■
0.024
0.018
0.012
0.006
0.000
CONCENTRATION (PPM)
SCN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

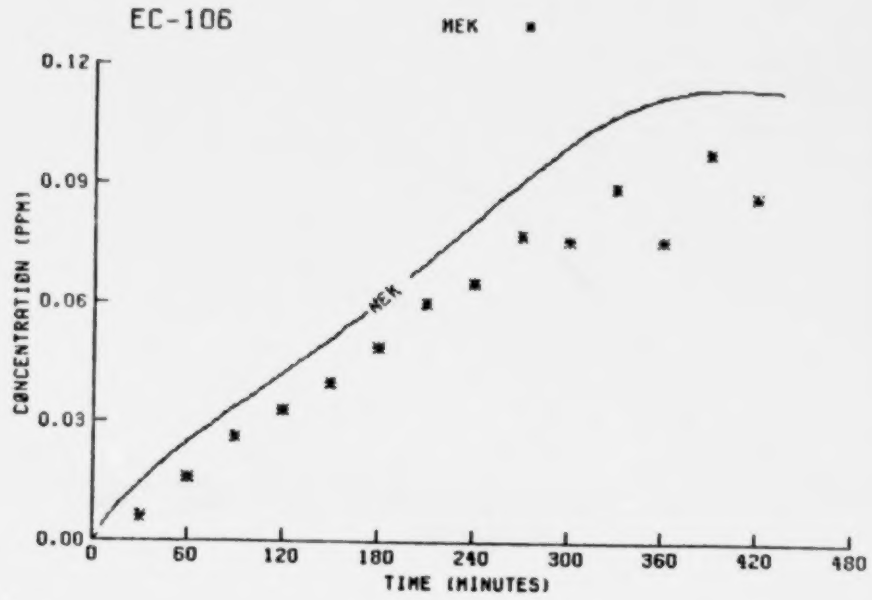

EC-99
C2N3 +
MEN3 ■
0.004
0.003
0.002
0.001
0.000
CONCENTRATION (PPM)
MEN3
C2N3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

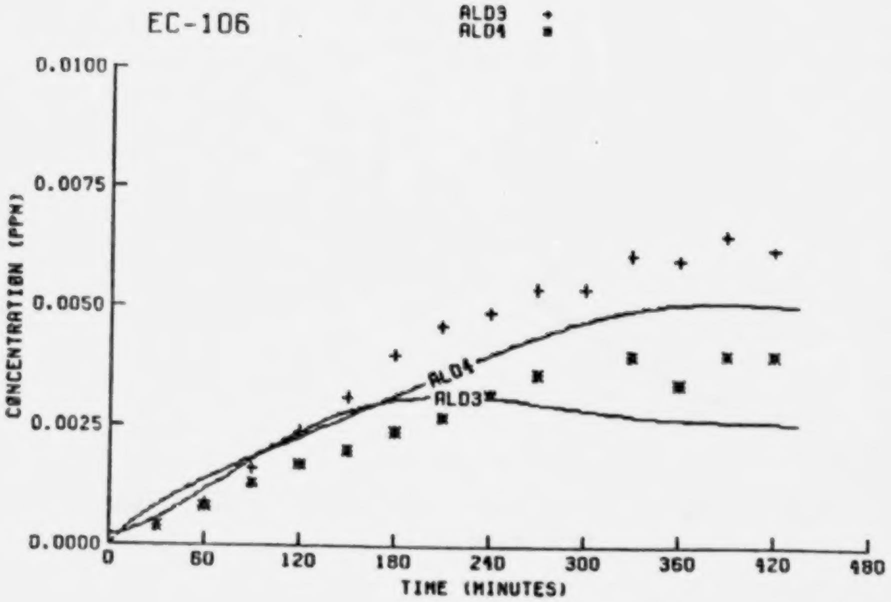

EC-106
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
NO2
O3
NO

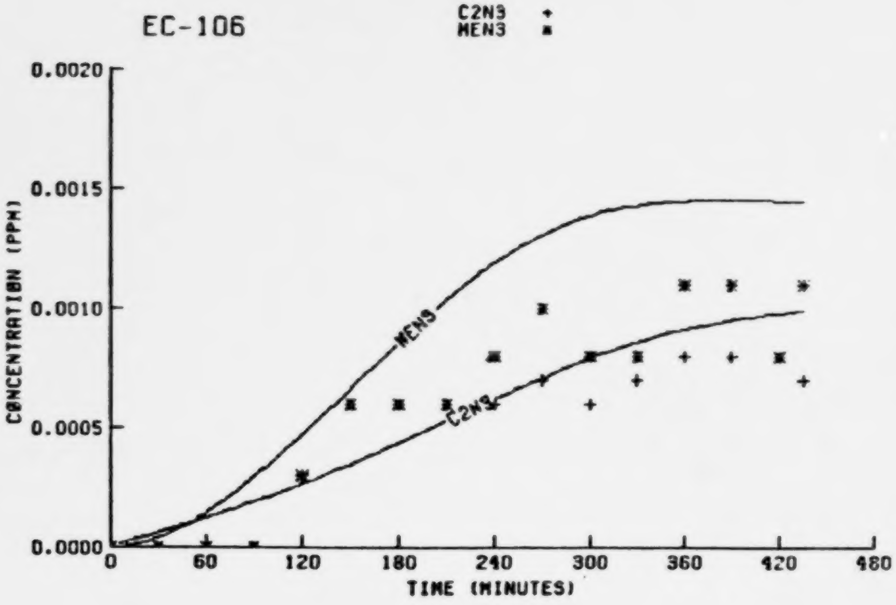

EC-106
PROP +
ALD2 ✱
0.44
0.33
0.22
0.11
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD2
PROP

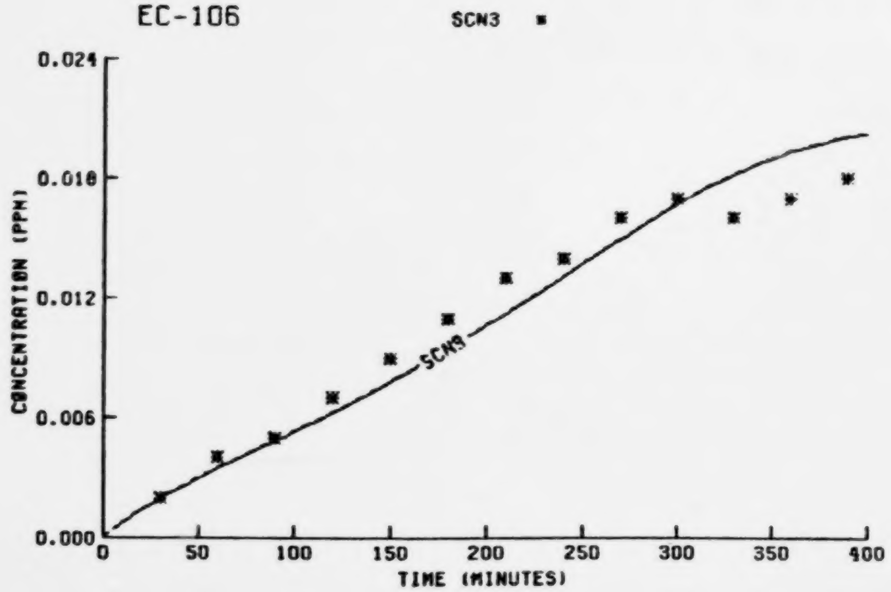

EC-106
BUT ✱
2.40
2.10
1.80
1.50
1.20
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
BUT

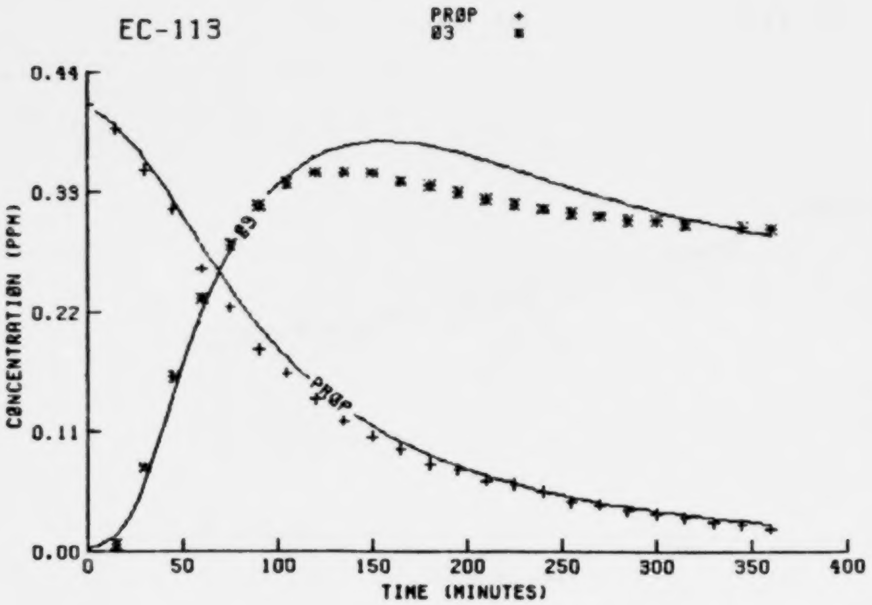

EC-106
FORM +
PAN ✱
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
FORM
PAN

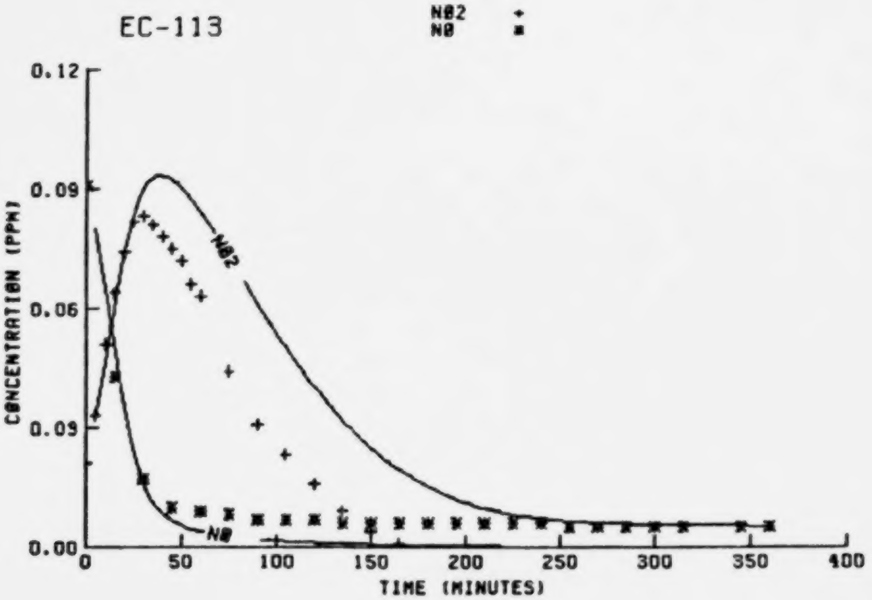

EC-106
MEK
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
MEK
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

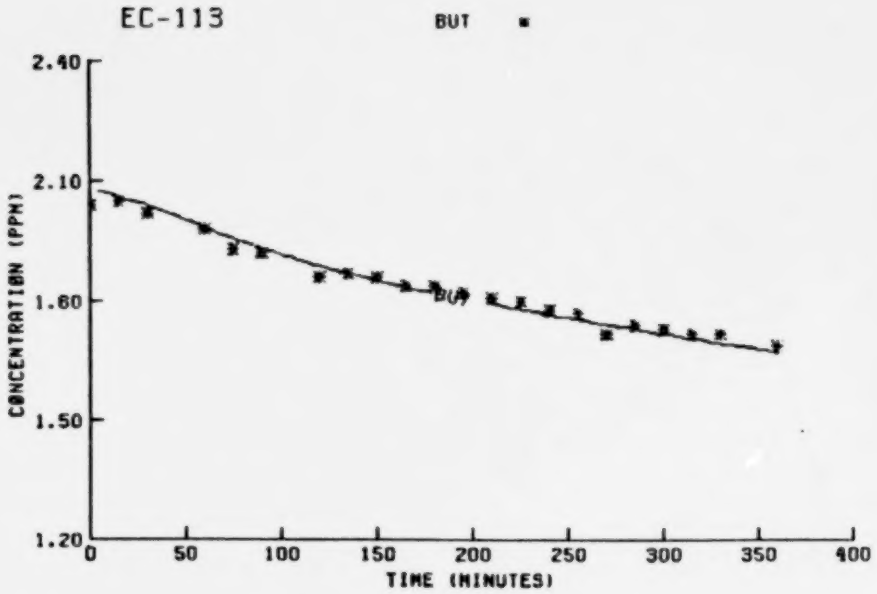

EC-106
ALD3 +
ALD4
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
ALD4
ALD3
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

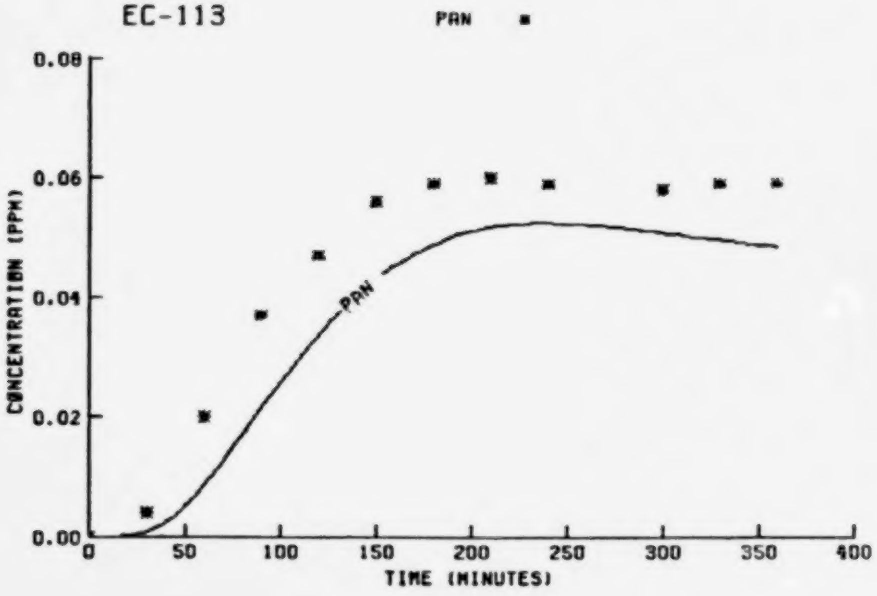

EC-106
C2N3 +
MEN3 *
0.0020
0.0015
0.0010
0.0005
0.0000
CONCENTRATION (PPM)
MEN3
C2N3
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

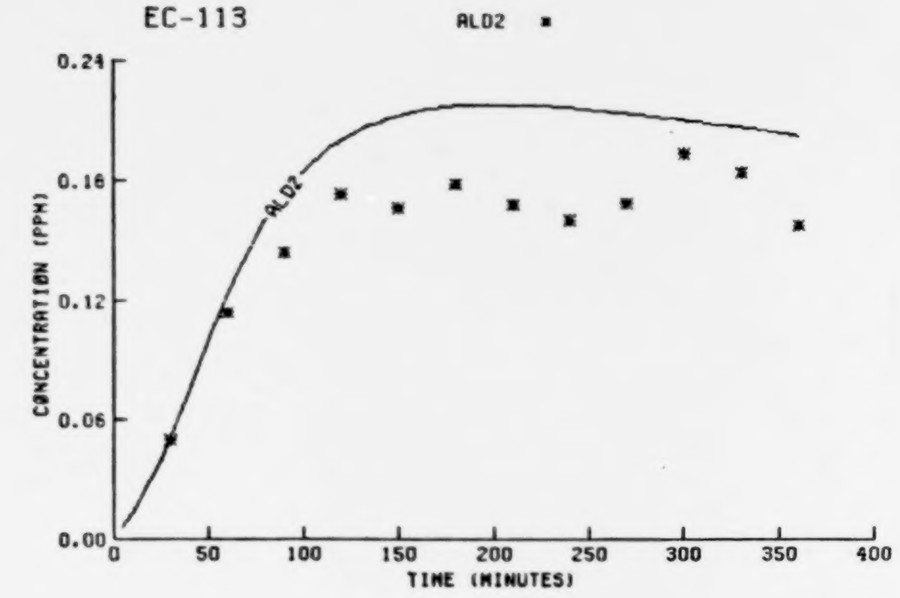

EC-106
SCN3 *
0.024
0.018
0.012
0.006
0.000
CONCENTRATION (PPM)
SCN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-113
PROP +
O3 ✱
0.44
0.39
0.22
0.11
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PROP
O3

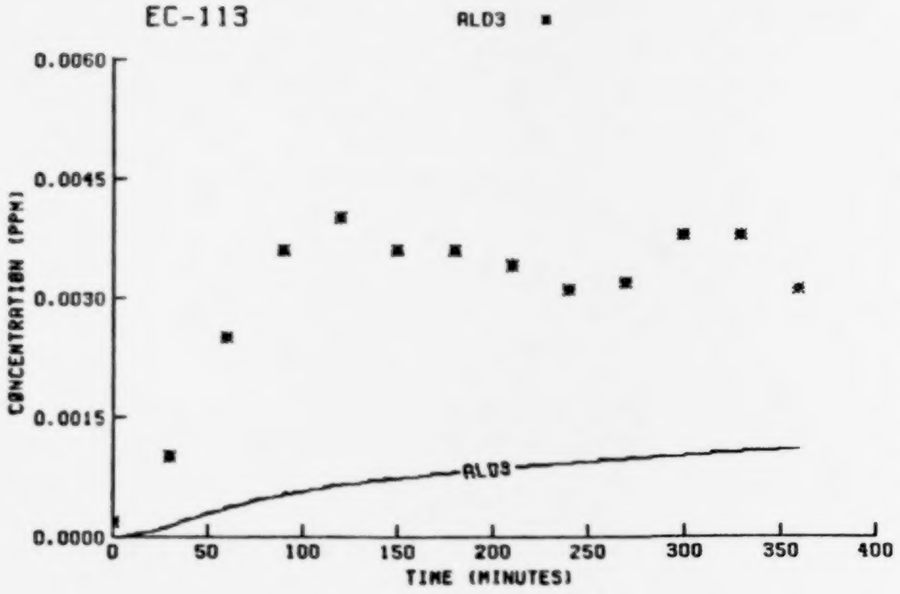

EC-113
NO2 +
NO ✱
0.12
0.09
0.06
0.09
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO


EC-113
BUT ■
2.40
2.10
1.60
1.50
1.20
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

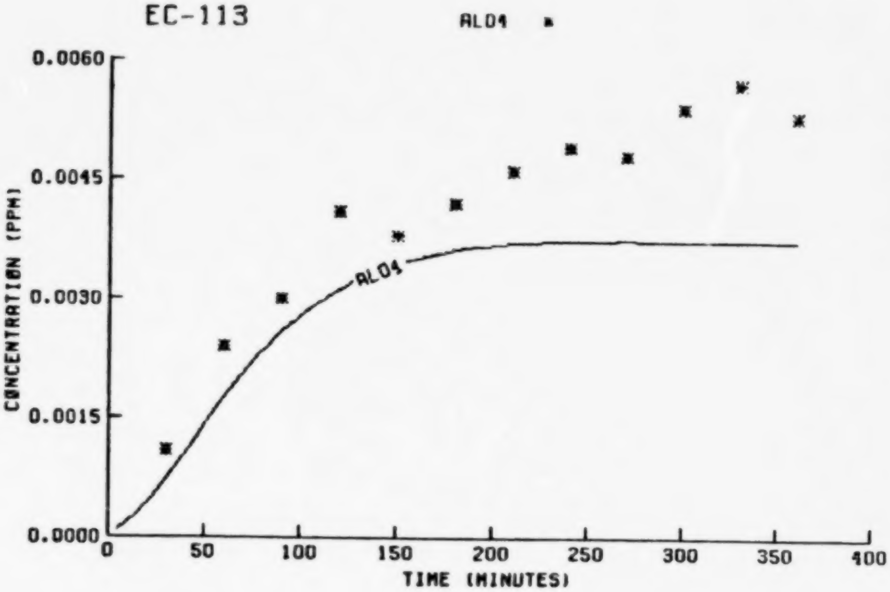

EC-113
PAN ■
0.08
0.06
0.04
0.02
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN



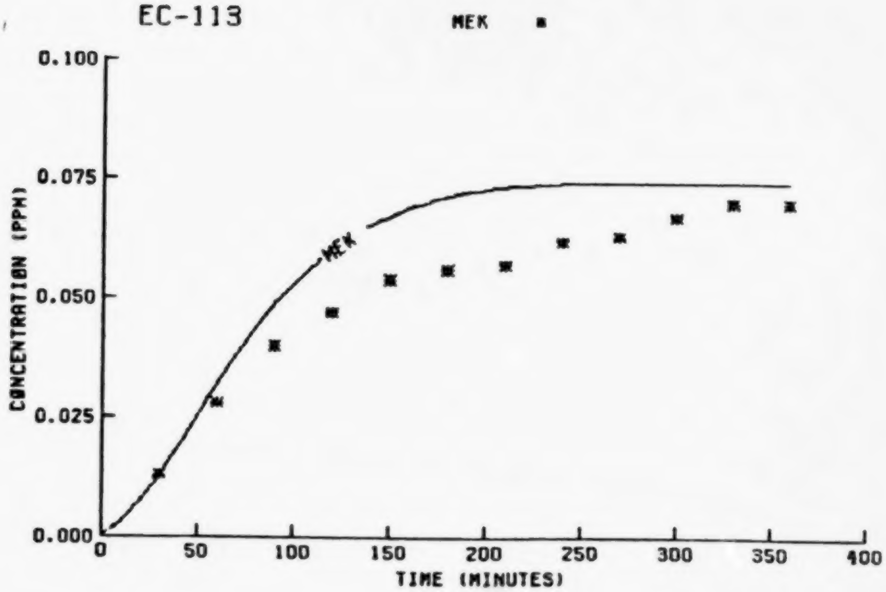
EC-113
ALD2 ✱
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)



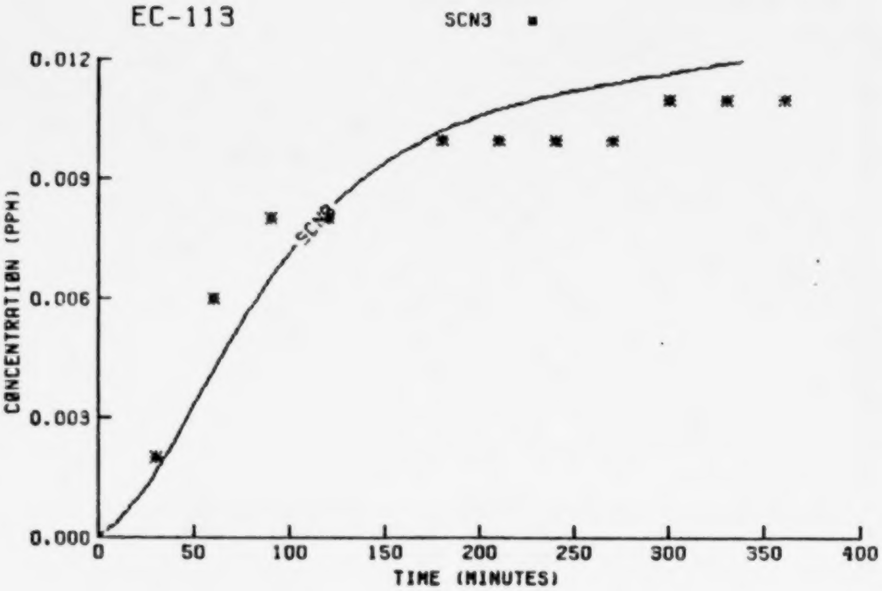
EC-113
ALD3 ✱
0.0060
0.0045
0.0030
0.0015
0.0000
CONCENTRATION (PPM)
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

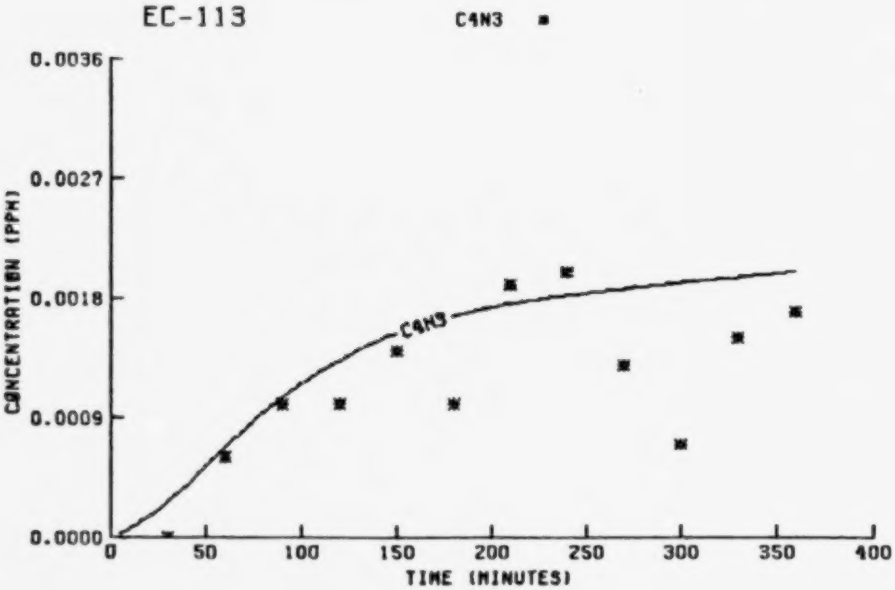


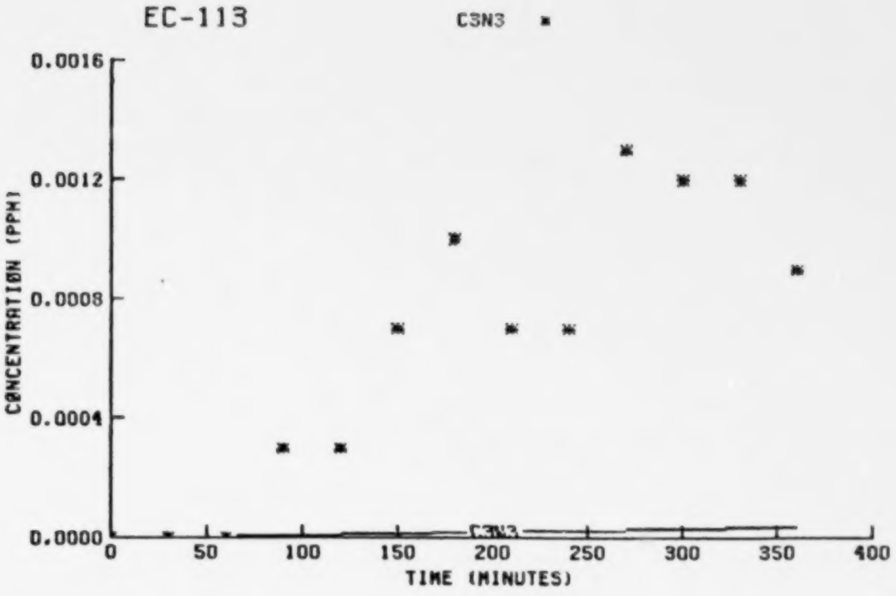
EC-113
AL04 *
0.0060
0.0045
0.0030
0.0015
0.0000
CONCENTRATION (PPM)
AL04
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

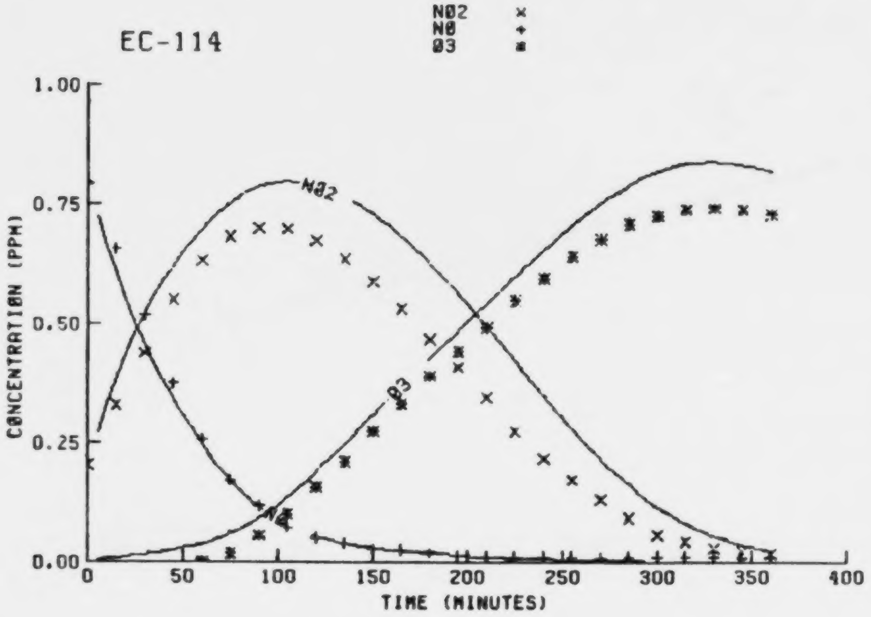


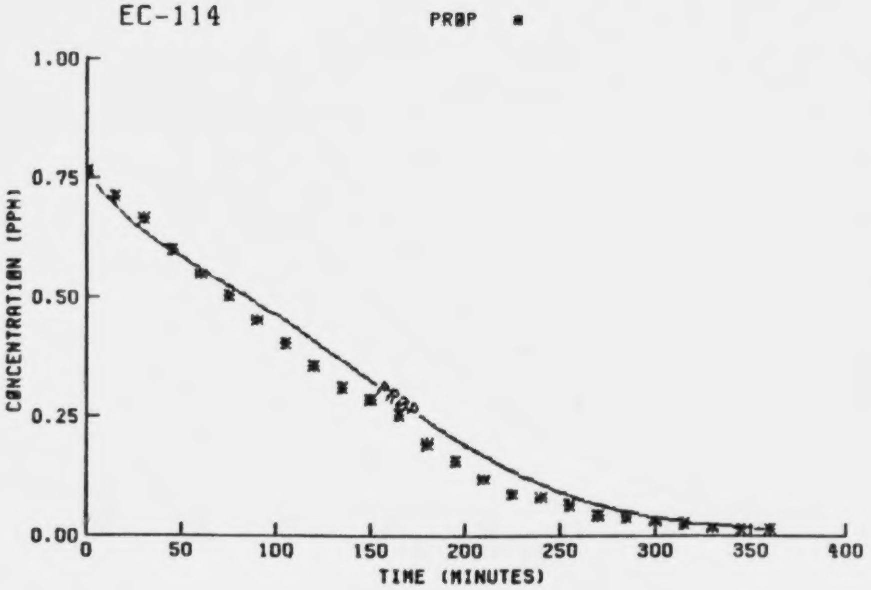
EC-113
MEK *
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
MEK
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

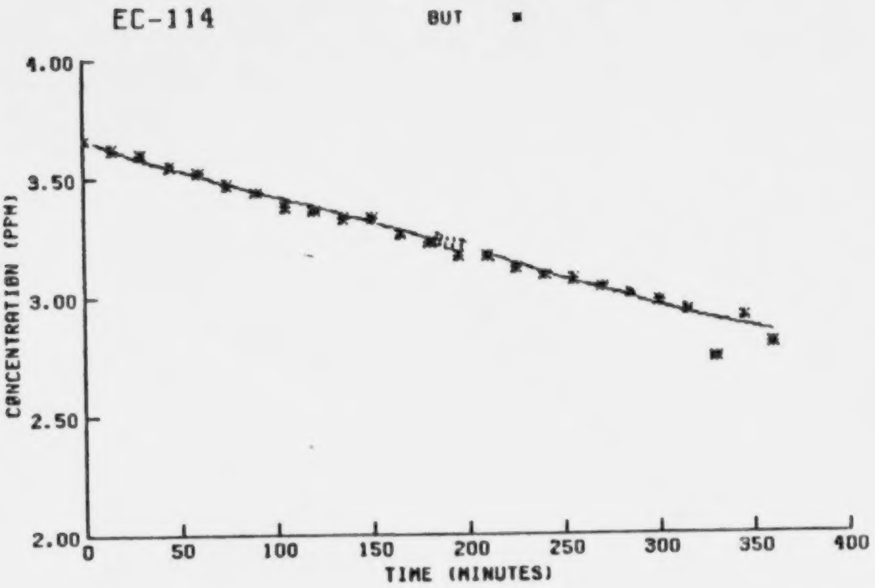

EC-113
SCN3 ■
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
SCN3

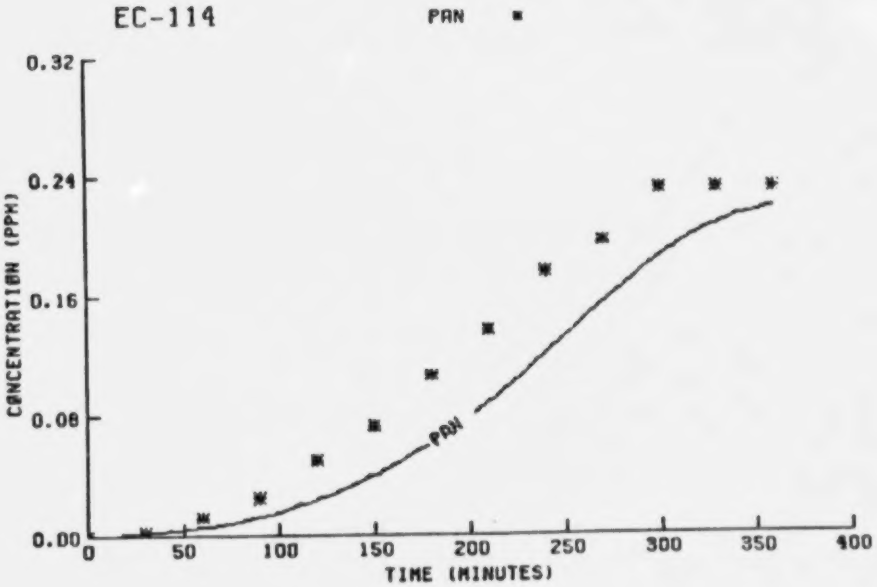

EC-113
C4N3 ■
0.0036
0.0027
0.0018
0.0009
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
C4N3

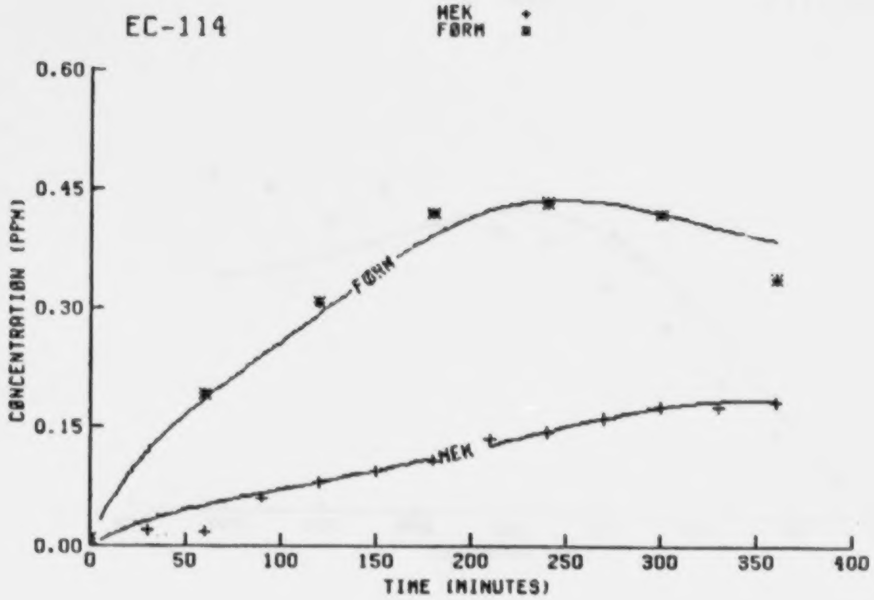

EC-113
C3N3 *
0.0016
0.0012
0.0008
0.0004
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
C3N3

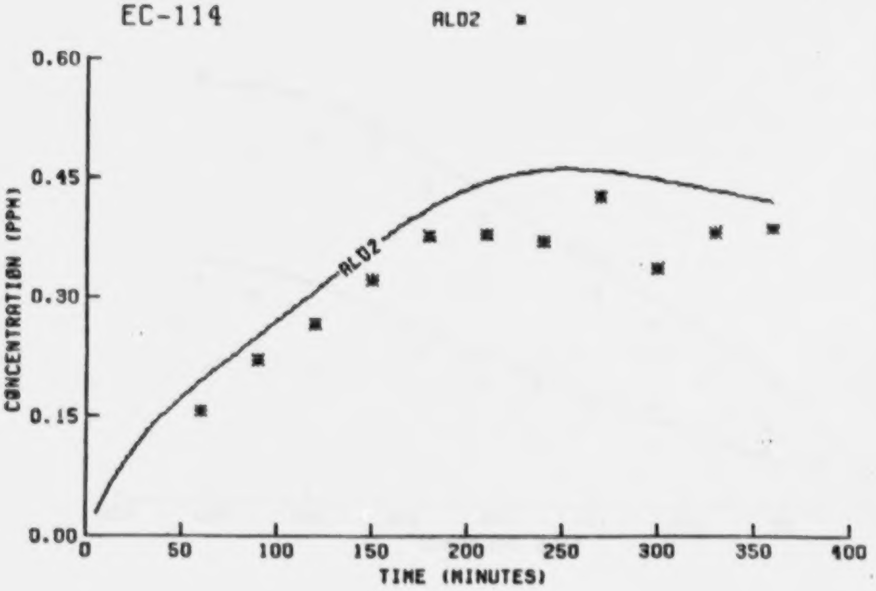

EC-114
NØ2 ×
NØ +
Ø3 ✱
CØNCENTRATIØN (PPM)
1.00
0.75
0.50
0.25
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NØ2
NØ
Ø3

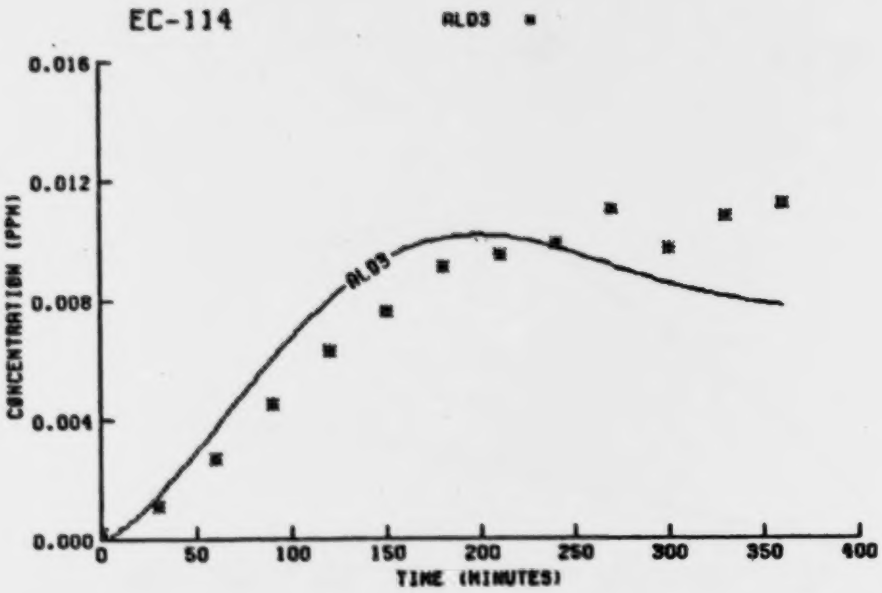

EC-114
PRØP ✱
CØNCENTRATIØN (PPM)
1.00
0.75
0.50
0.25
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PRØP

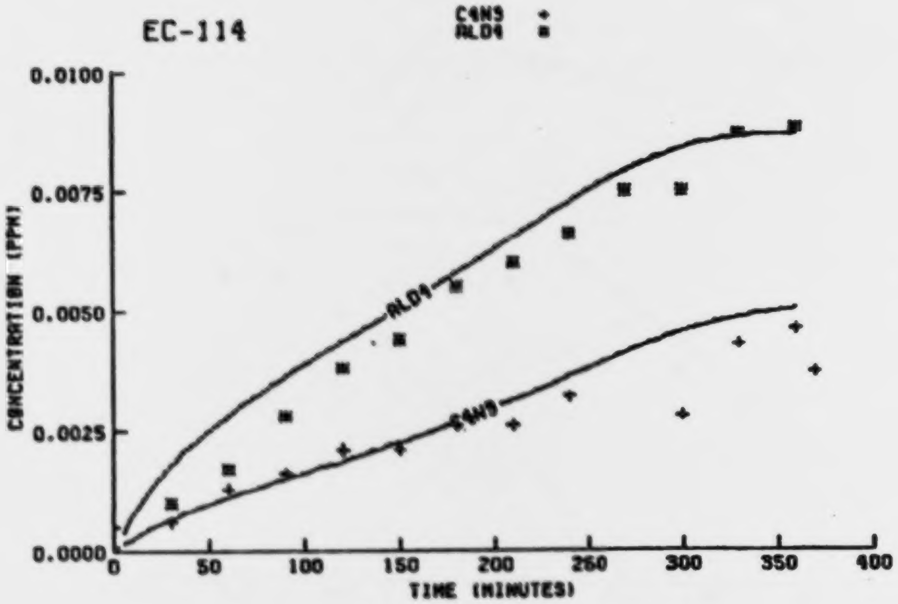

EC-114
BUT *
4.00
3.50
3.00
2.50
2.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

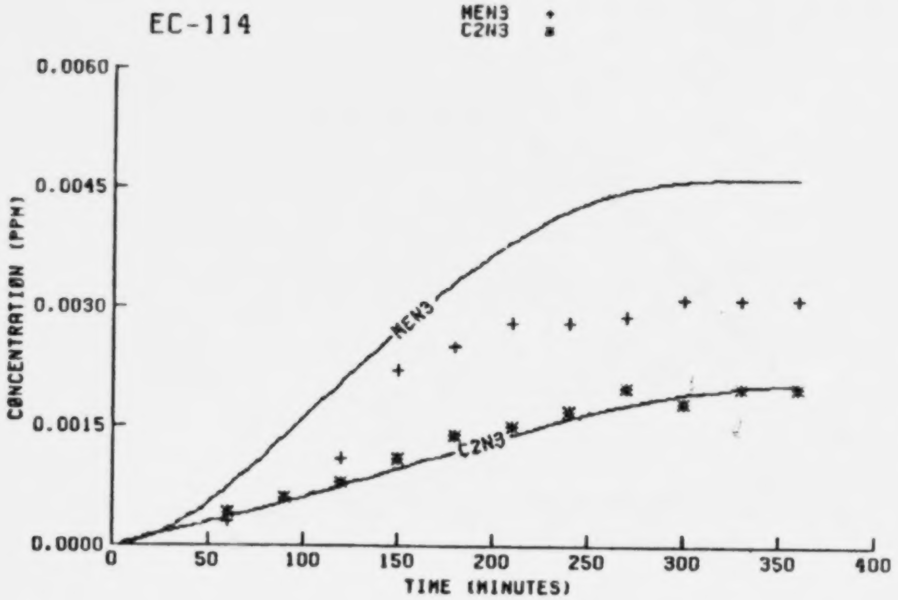

EC-114
PAN *
0.32
0.24
0.16
0.08
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

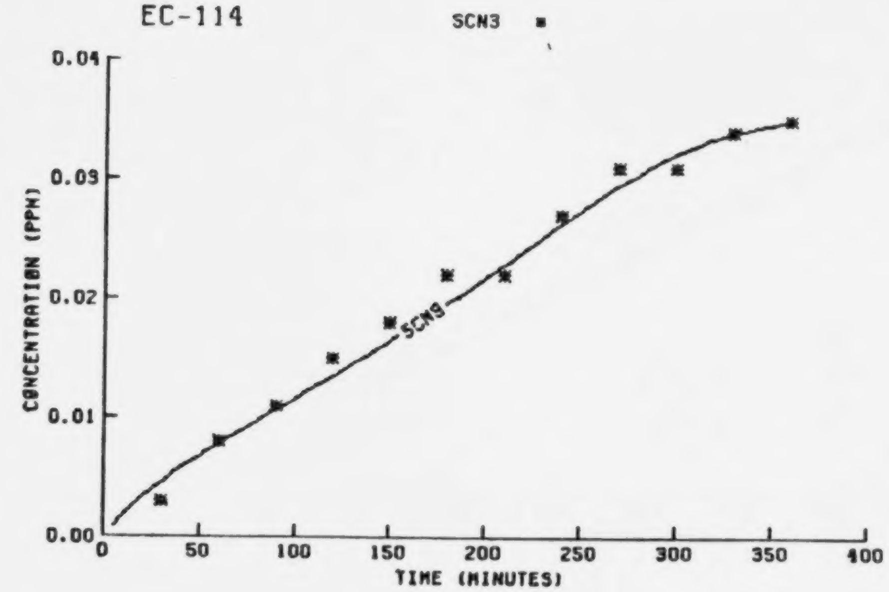

EC-114
MEK +
FØRM ✱
0.60
0.45
0.30
0.15
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FØRM
MEK

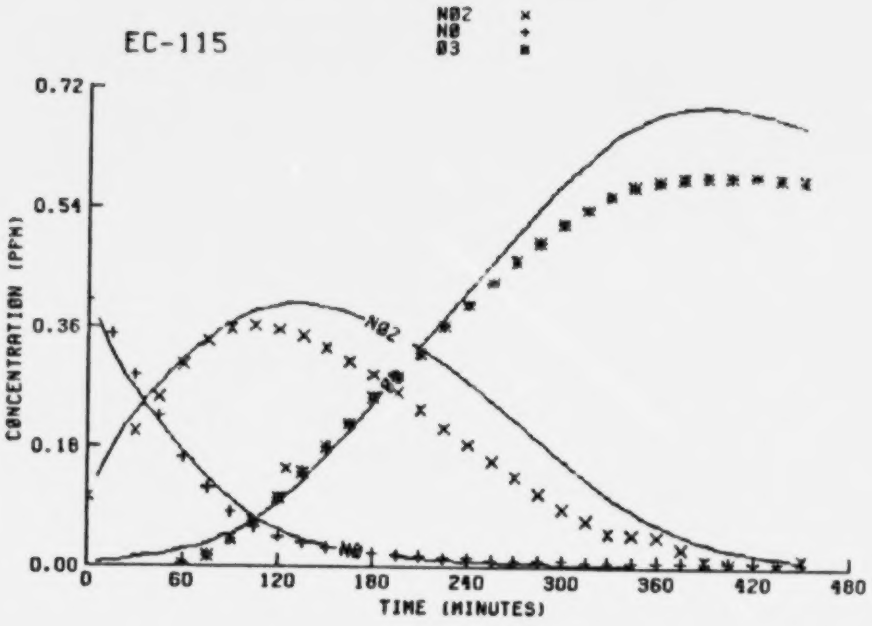

EC-114
ALD2 ✱
0.60
0.45
0.30
0.15
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2

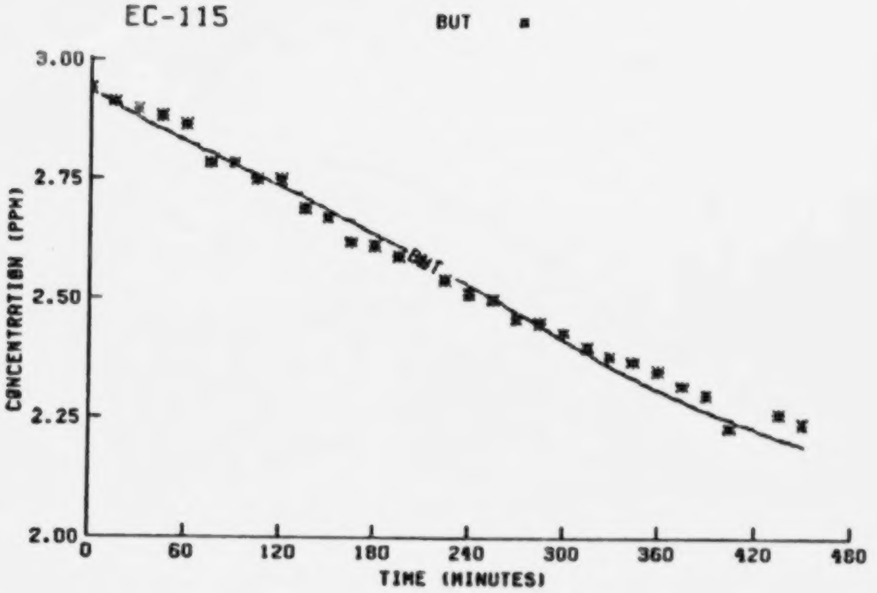

EC-114
ALD3 ■
0.016
0.012
0.008
0.004
0.000
CONCENTRATION (PPM)
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

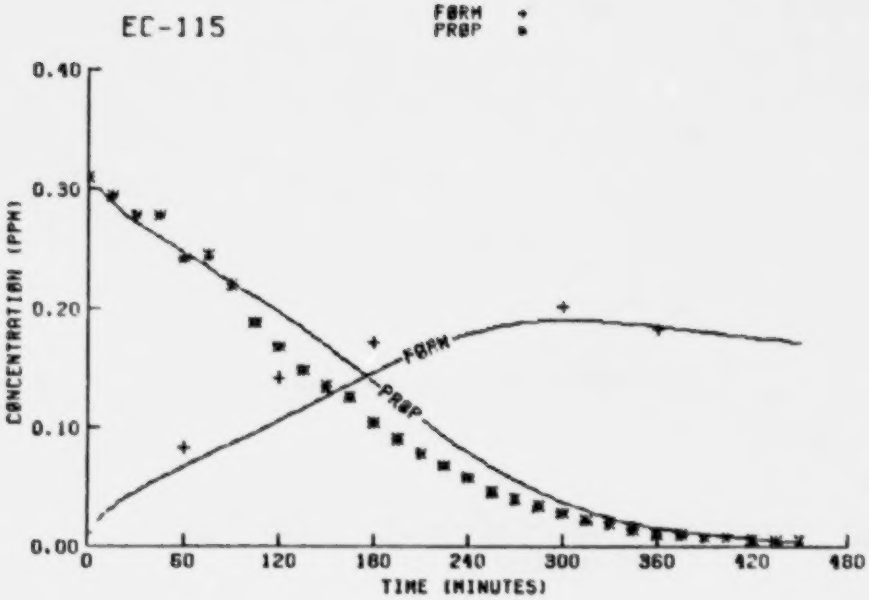

EC-114
C4N3 +
ALD4 ■
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
ALD4
C4N3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

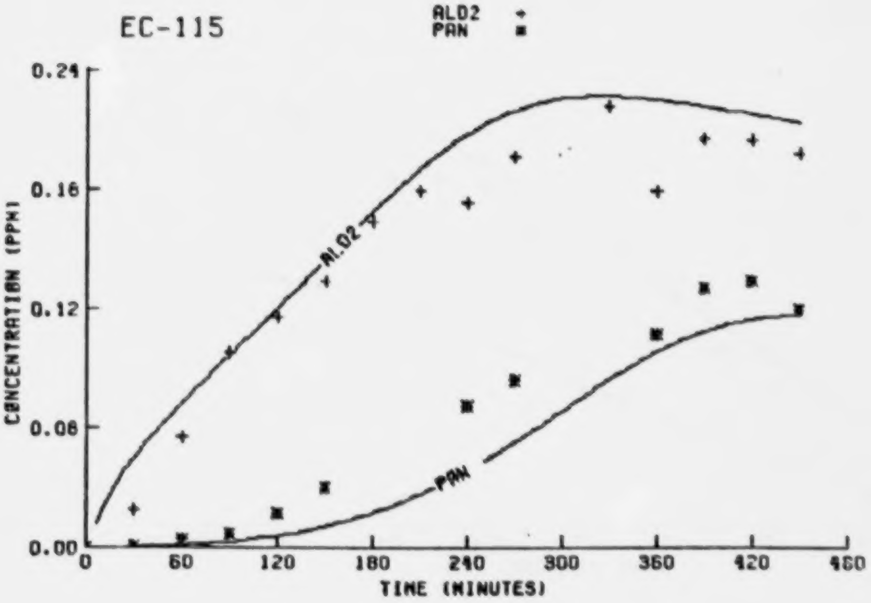

EC-114
MEN3 +
C2N3 ✱
0.0060
0.0045
0.0030
0.0015
0.0000
CONCENTRATION (PPM)
MEN3
C2N3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

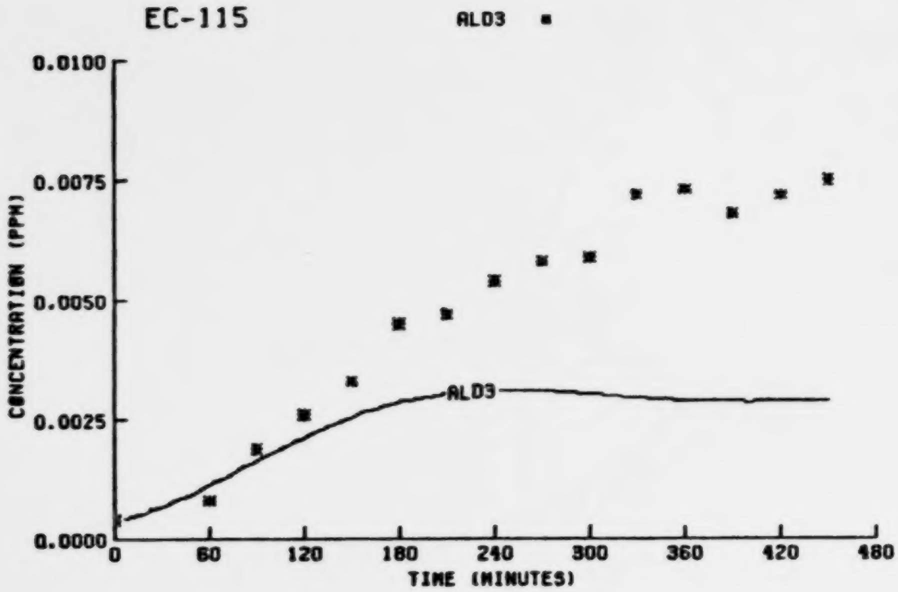

EC-114
SCN3 ✱
0.04
0.03
0.02
0.01
0.00
CONCENTRATION (PPM)
SCN3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

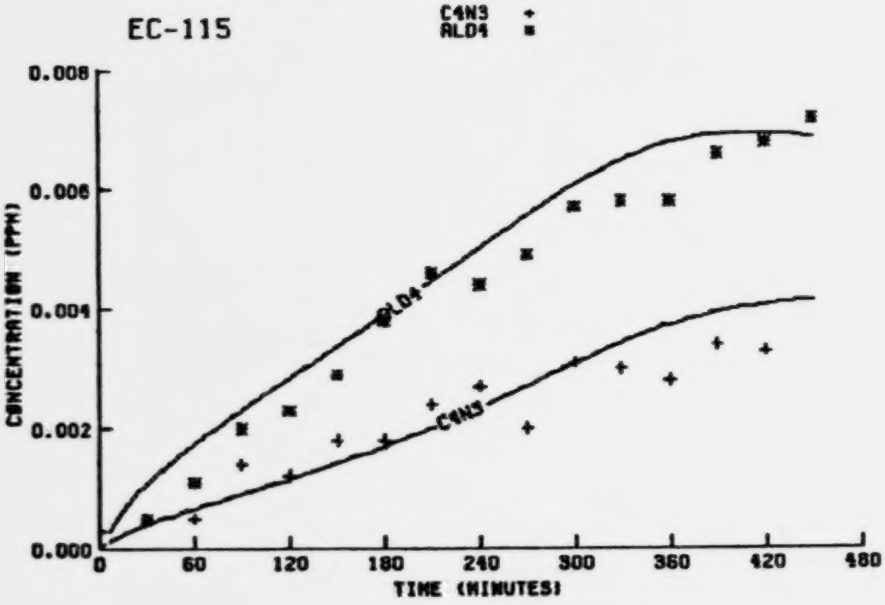

EC-115
NO2 ×
NO +
O3 ■
0.72
0.54
0.36
0.18
0.00
CONCENTRATION (PPM)
NO2
NO
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

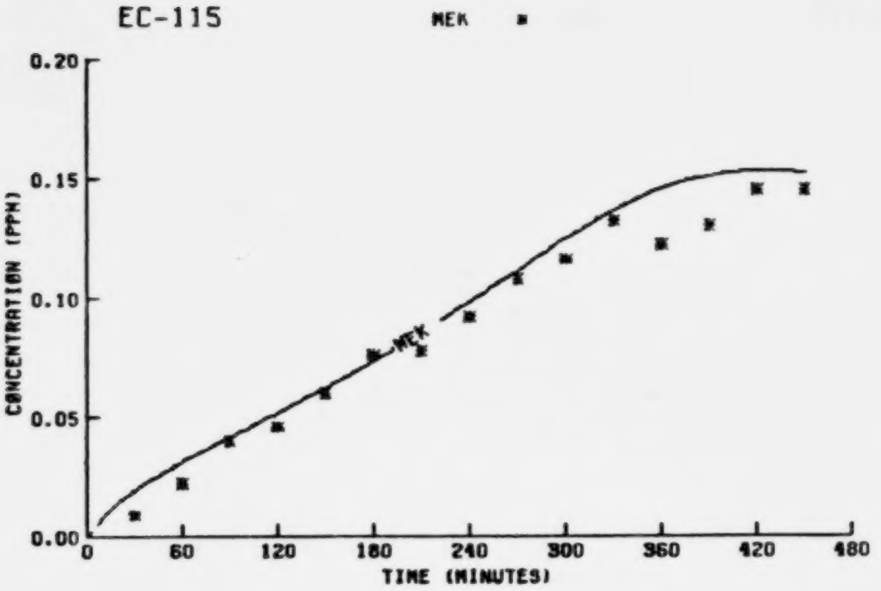

EC-115
BUT ■
3.00
2.75
2.50
2.25
2.00
CONCENTRATION (PPM)
BUT
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

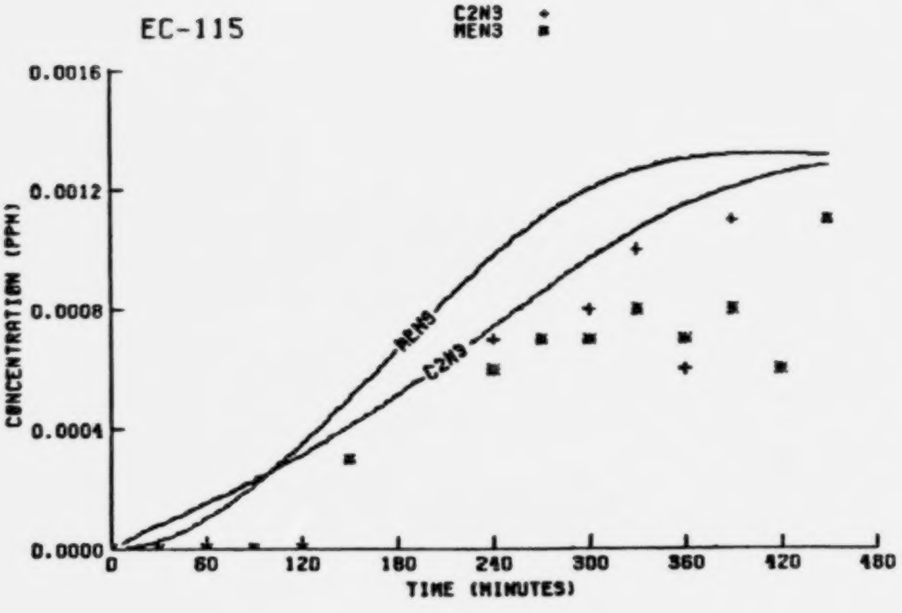

EC-115
FØRM +
PRØP ✱
0.40
0.30
0.20
0.10
0.00
CØNCENTRATIØN (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
FØRM
PRØP

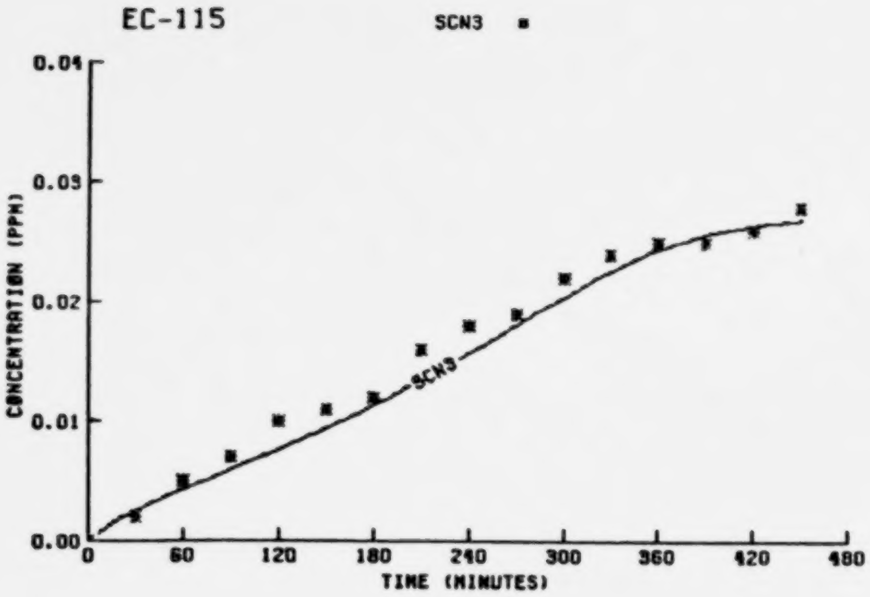

EC-115
ALD2 +
PAN ✱
0.24
0.16
0.12
0.08
0.00
CØNCENTRATIØN (PPM)
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ALD2
PAN

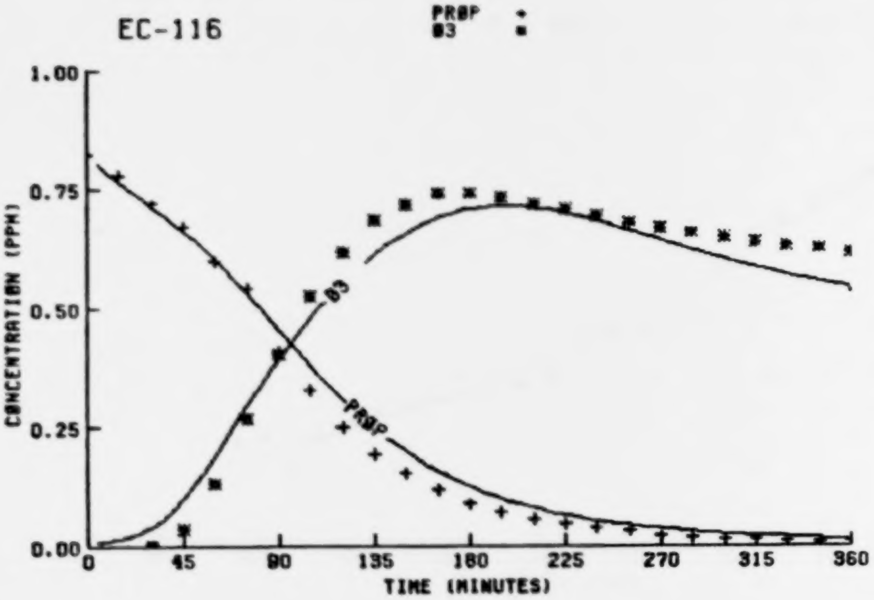

EC-115
ALD3 ■
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
ALD3
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

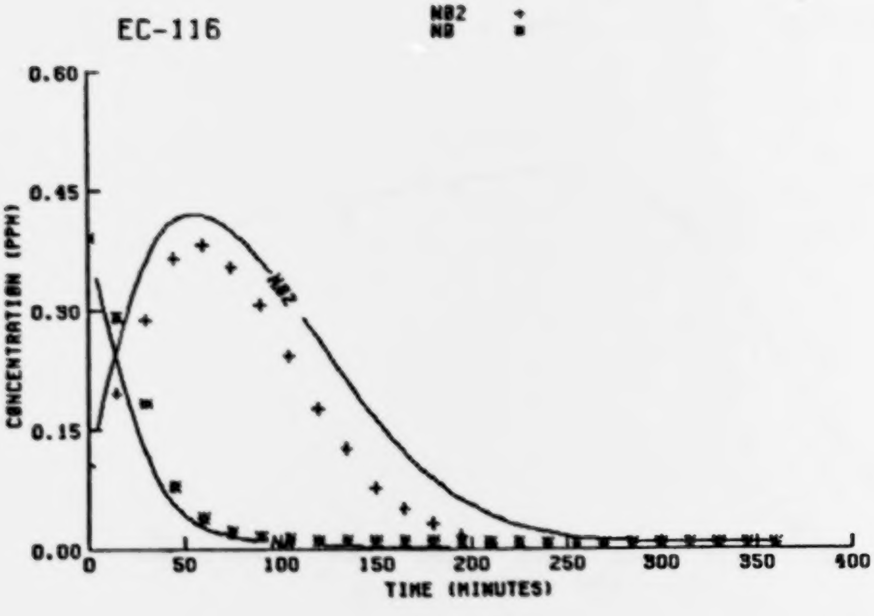

EC-115
C4N3 +
ALD4 ■
0.008
0.006
0.004
0.002
0.000
CONCENTRATION (PPM)
ALD4
C4N3
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

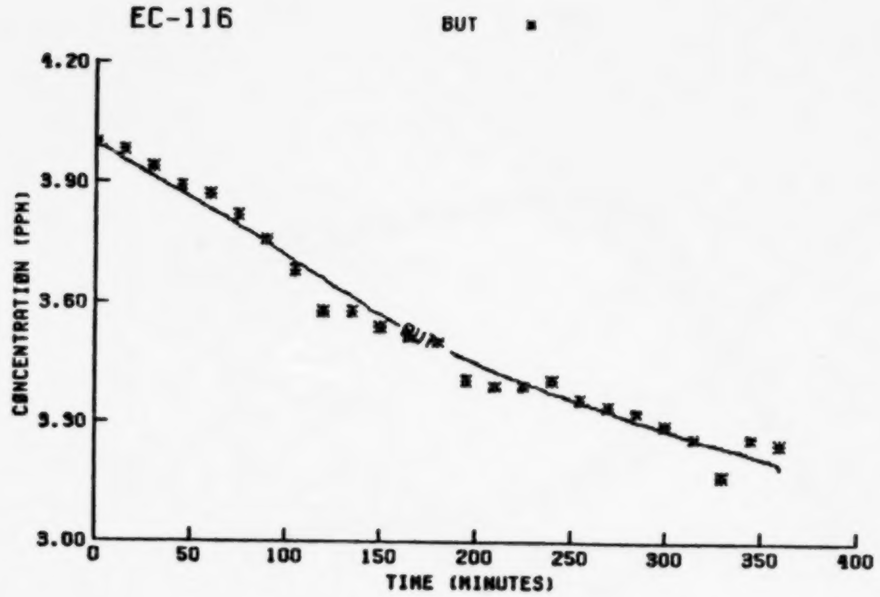

EC-115
MEK ✱
CONCENTRATION (PPM)
0.20
0.15
0.10
0.05
0.00
MEK
0
60
120
180
240
300
360
420
480
TIME (MINUTES)


EC-115
C2N3 +
MEN3 ✱
CONCENTRATION (PPM)
0.0016
0.0012
0.0008
0.0004
0.0000
MEN3
C2N3
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

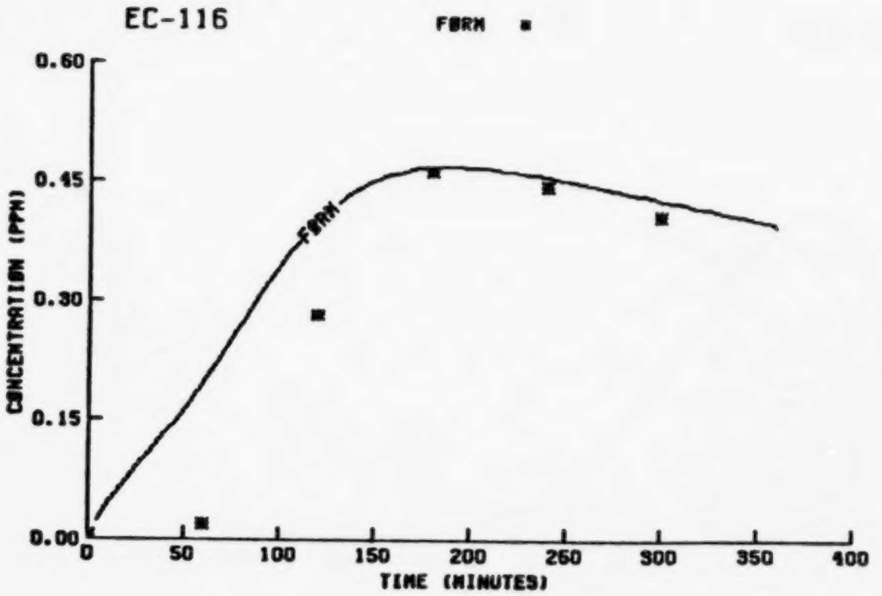

EC-115
SCN3
CONCENTRATION (PPM)
0.04
0.03
0.02
0.01
0.00
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
SCN3


EC-116
PRØP +
Ø3 *
1.00
0.75
0.50
0.25
0.00
CONCENTRATIØN (PPM)
0
45
90
135
180
225
270
315
360
TIME (MINUTES)
Ø3
PRØP

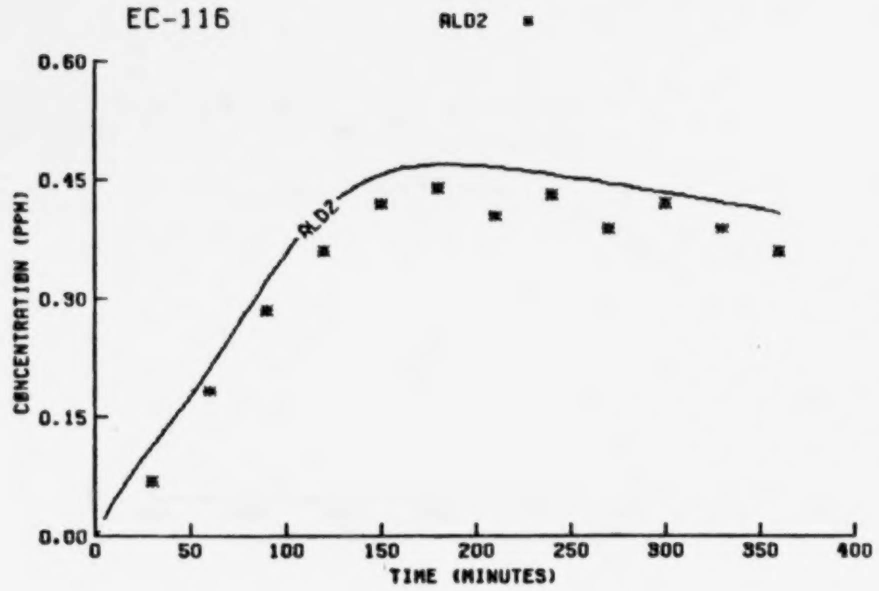

EC-116
NØ2 +
NØ *
0.60
0.45
0.30
0.15
0.00
CONCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NØ2
NØ

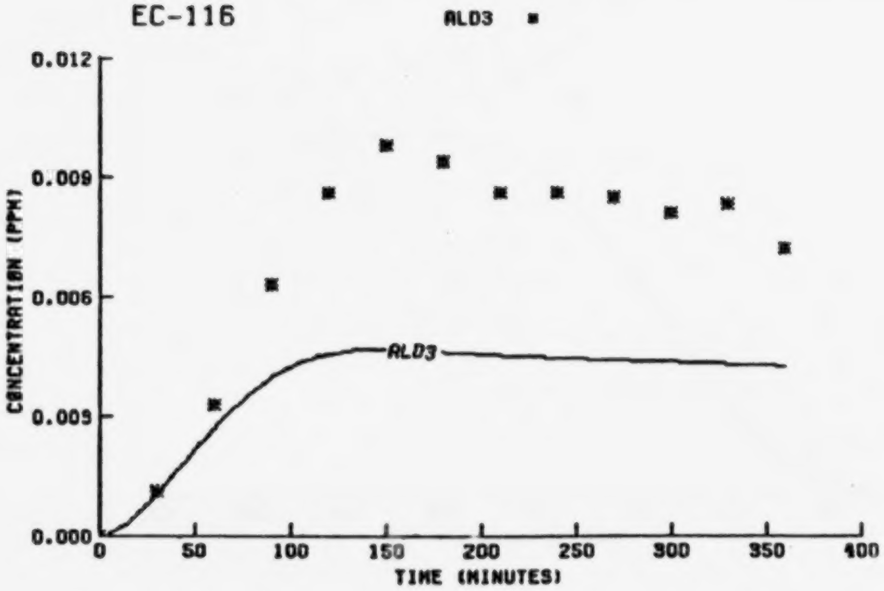


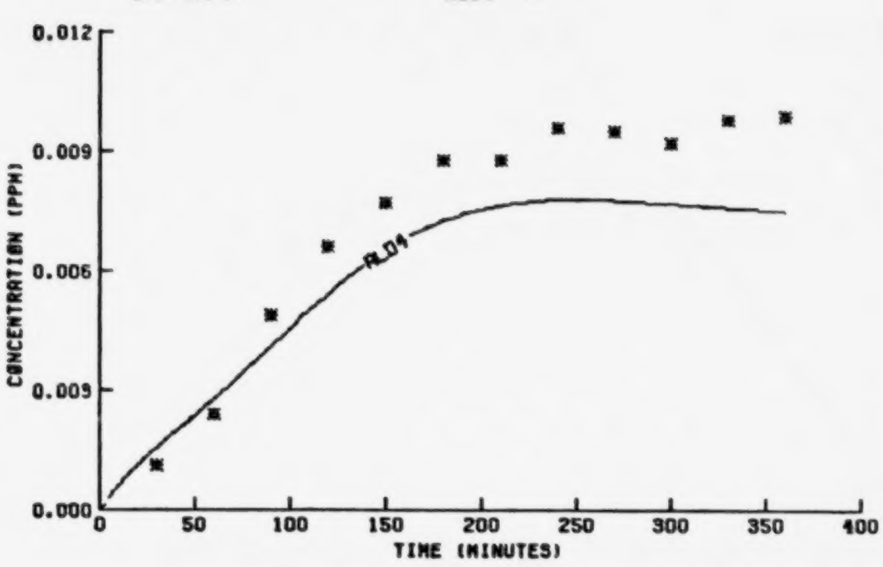
EC-116
BUT
4.20
3.90
3.60
3.30
3.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT

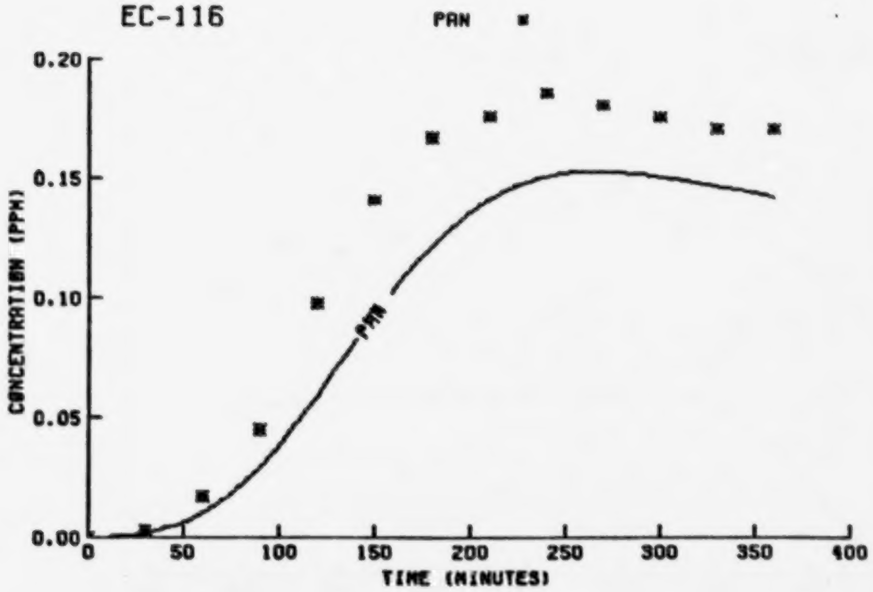


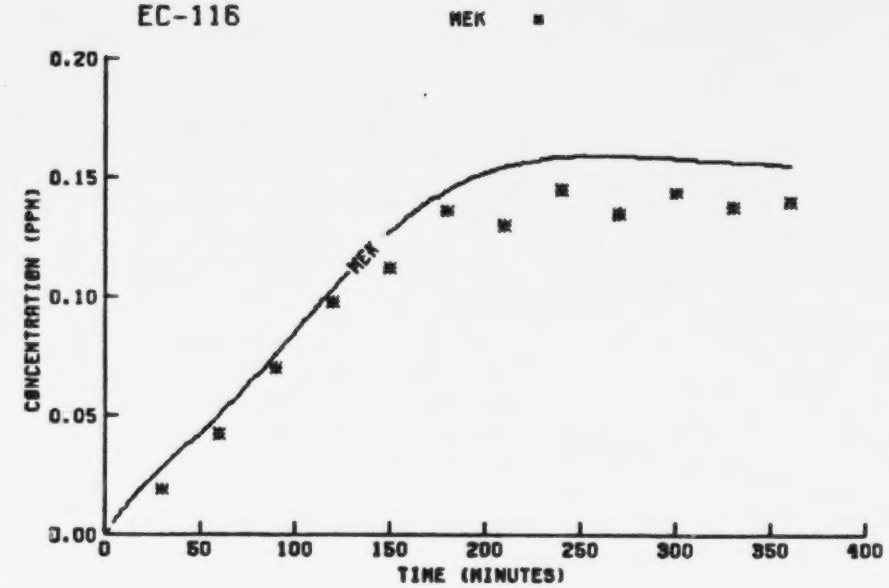
EC-116
FORM
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM

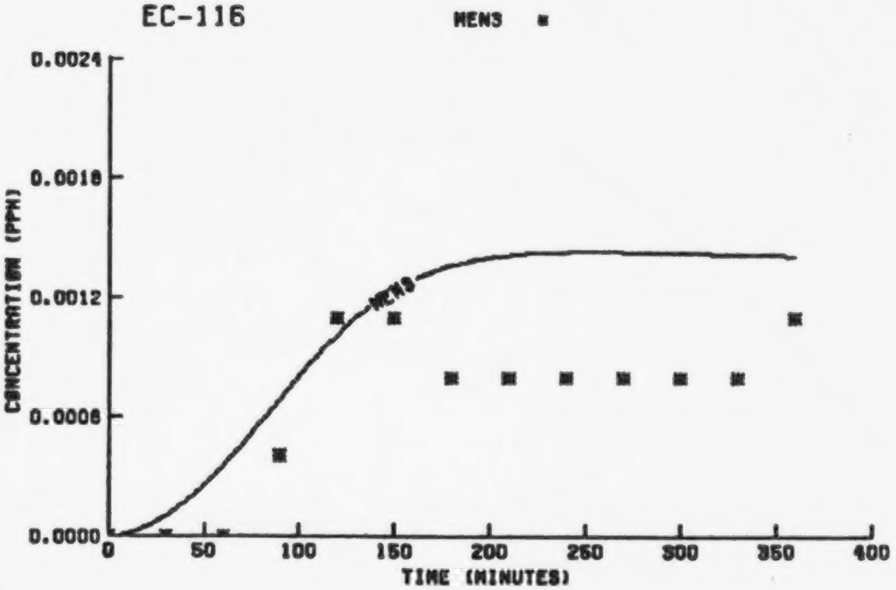

EC-116
ALD2 ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
ALD2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

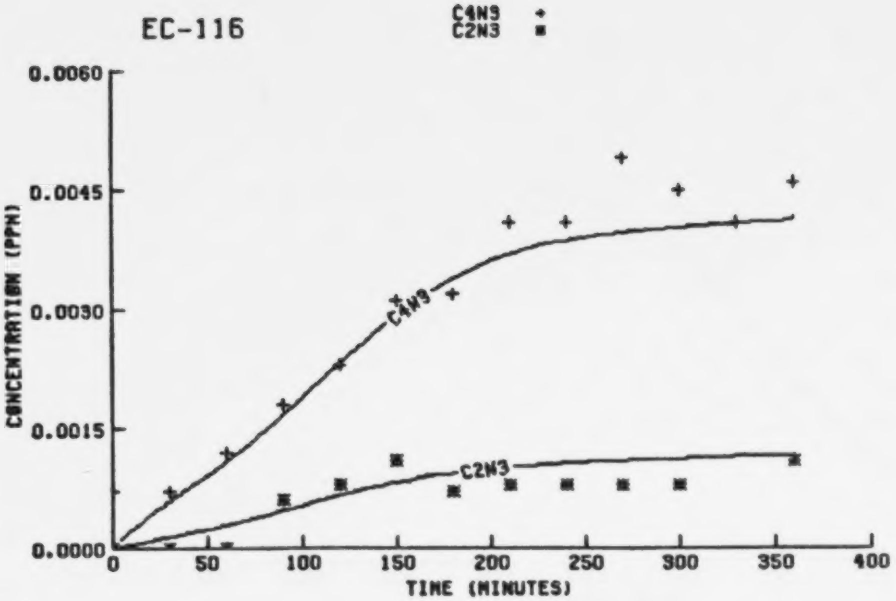

EC-116
ALD3 ✱
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-116
ALD4 *
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
ALD4
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

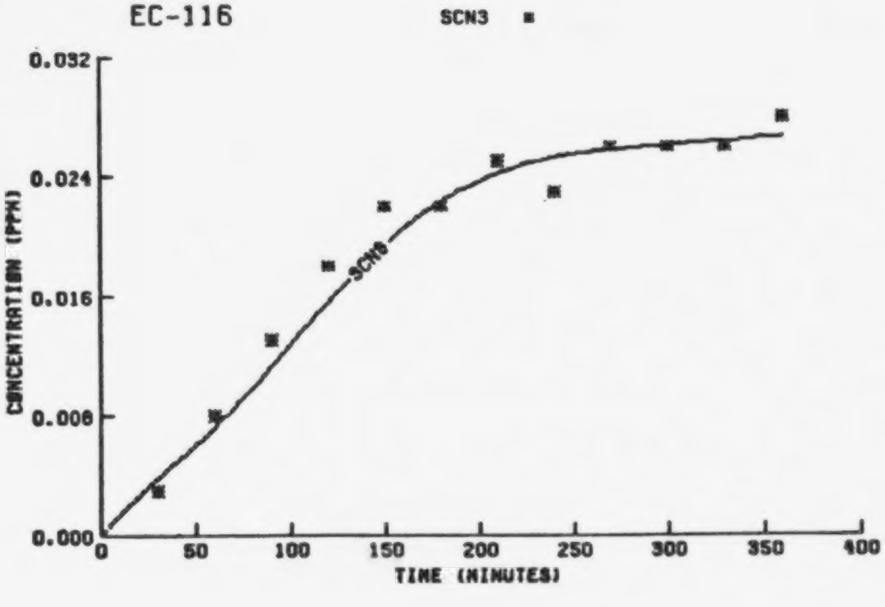

EC-116
PAN *
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-116
MEK
CONCENTRATION (PPM)
0.20
0.15
0.10
0.05
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-116
MEN3
CONCENTRATION (PPM)
0.0024
0.0018
0.0012
0.0006
0.0000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

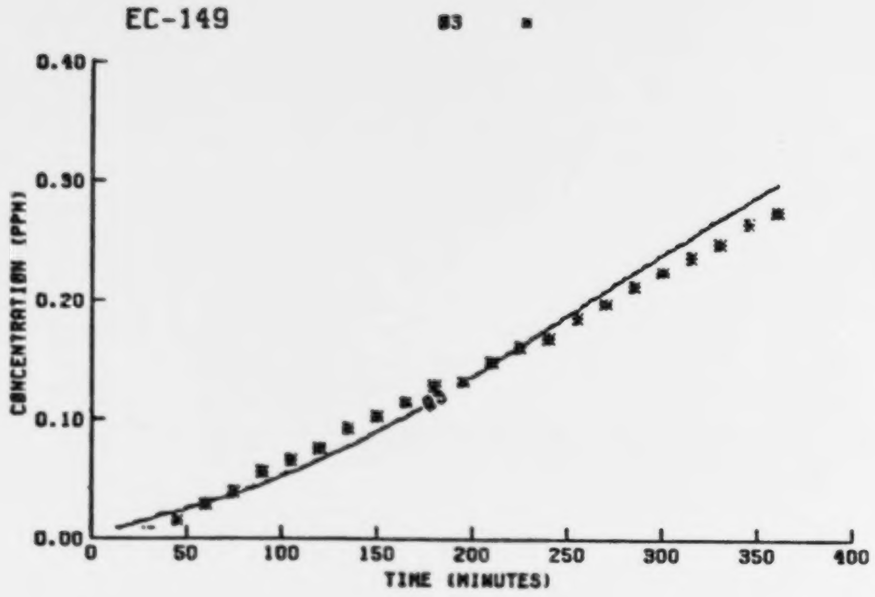


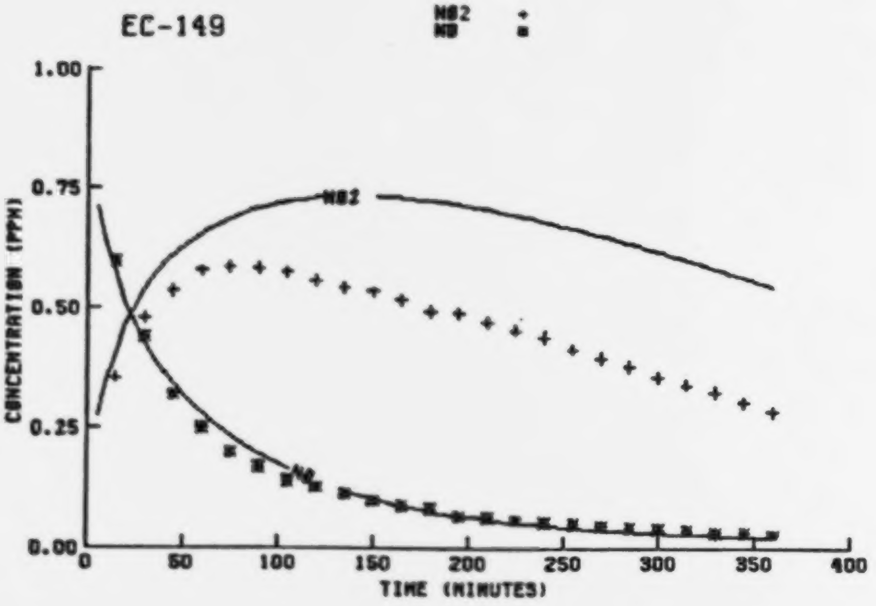
EC-116
C4N3 +
C2N3 ▪
0.0060
0.0045
0.0030
0.0015
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
C4N3
C2N3

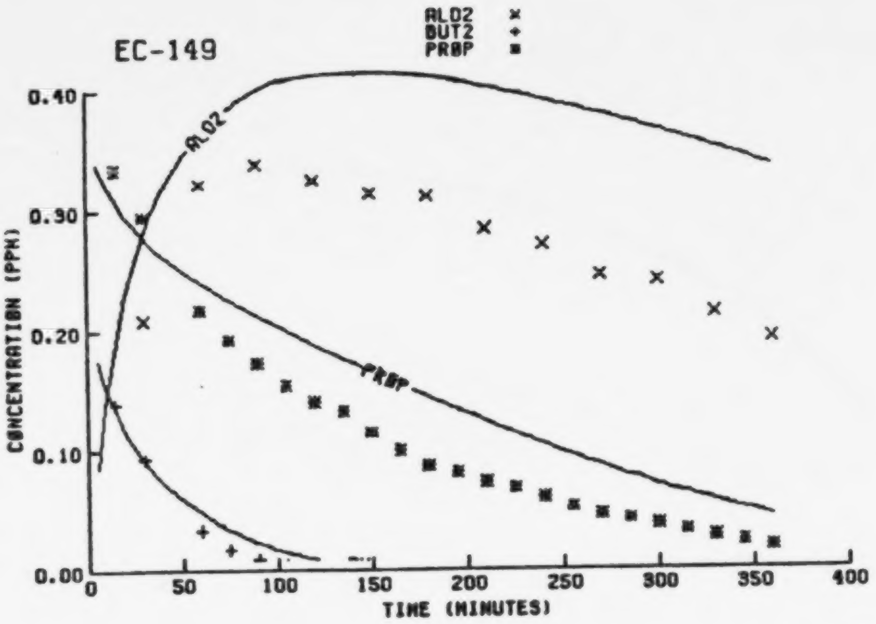


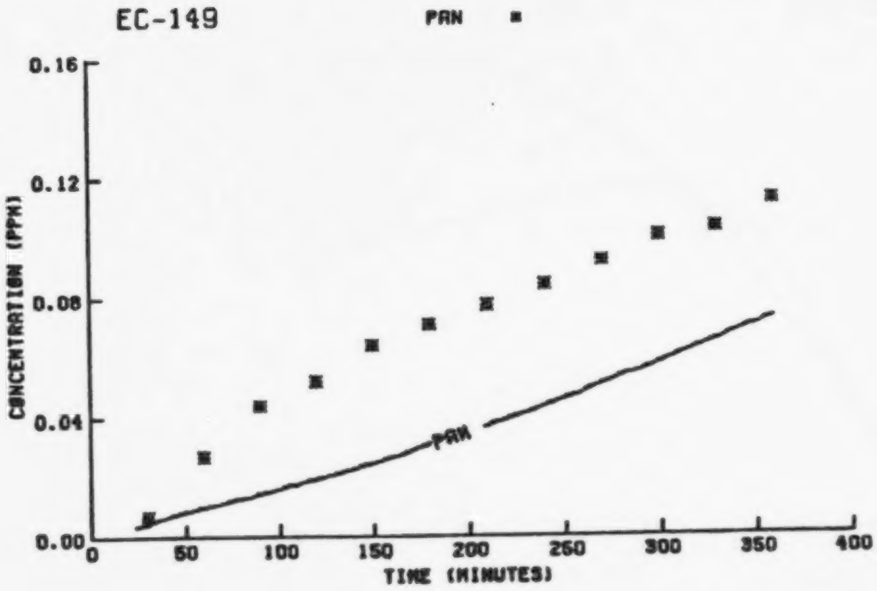
EC-116
SCN3 ▪
0.032
0.024
0.016
0.008
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
SCN3

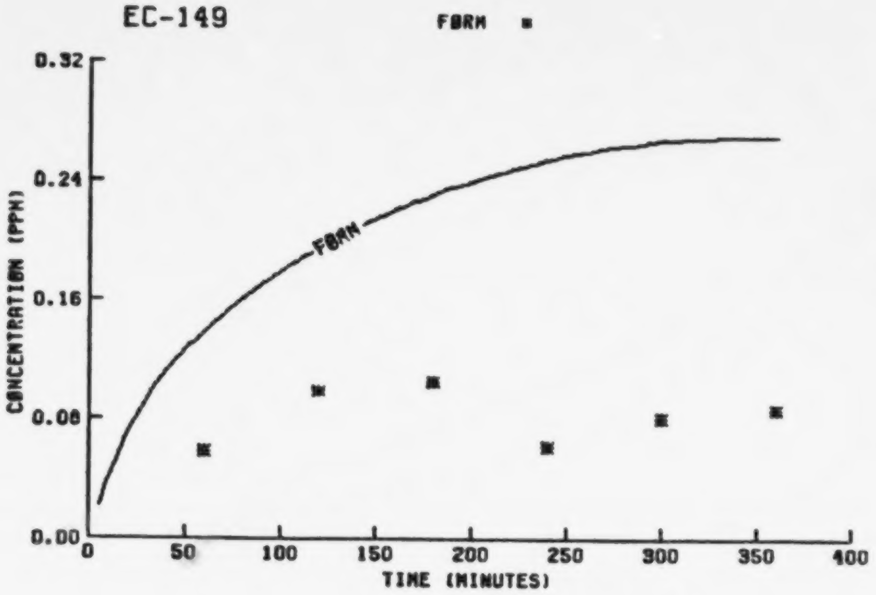
UCR PROPYLENE/TRANS-2-BUTENE EXPERIMENT

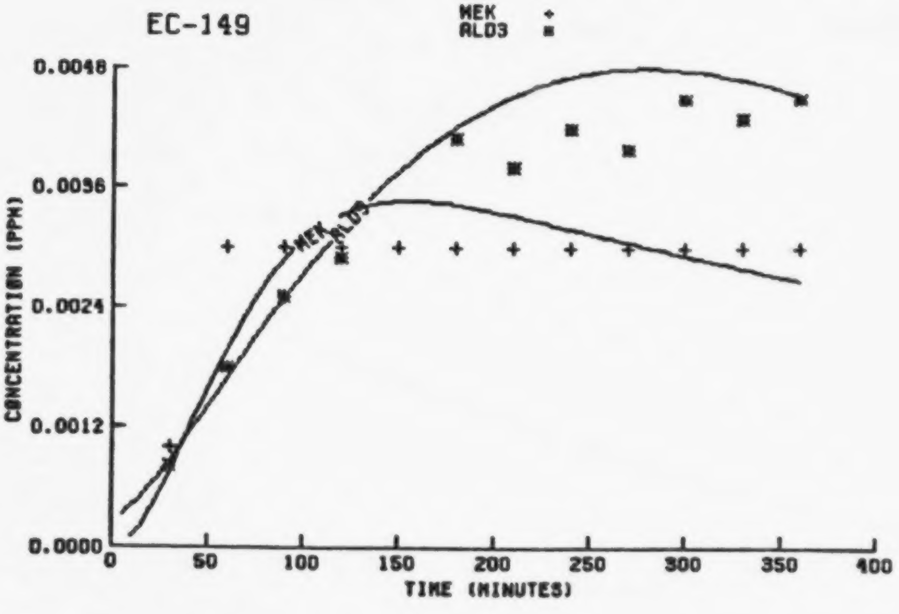

EC-149
O3 ×
O3
CONCENTRATION (PPM)
0.00
0.10
0.20
0.30
0.40
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

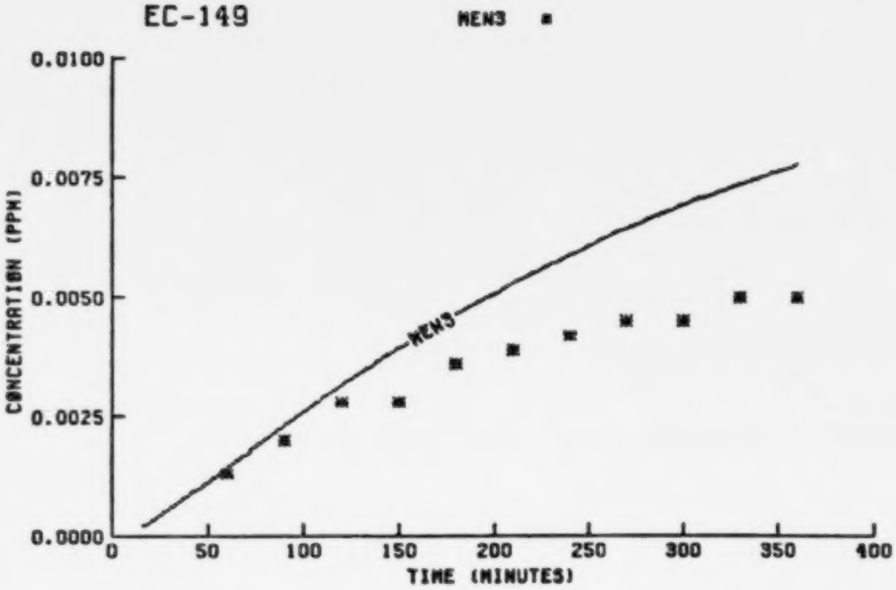

EC-149
NO2 +
NO ×
NO2
NO
CONCENTRATION (PPM)
0.00
0.25
0.50
0.75
1.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400


EC-149
ALD2 ×
BUT2 +
PRBP ▪
ALD2
PRBP
CONCENTRATION (PPM)
0.40
0.30
0.20
0.10
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

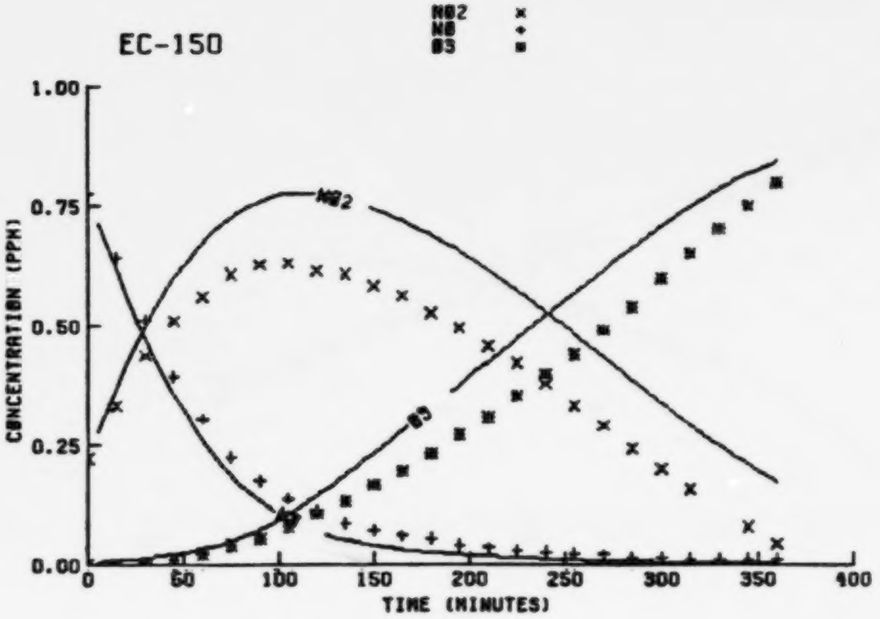

EC-149
PAN ▪
PAN
CONCENTRATION (PPM)
0.16
0.12
0.08
0.04
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

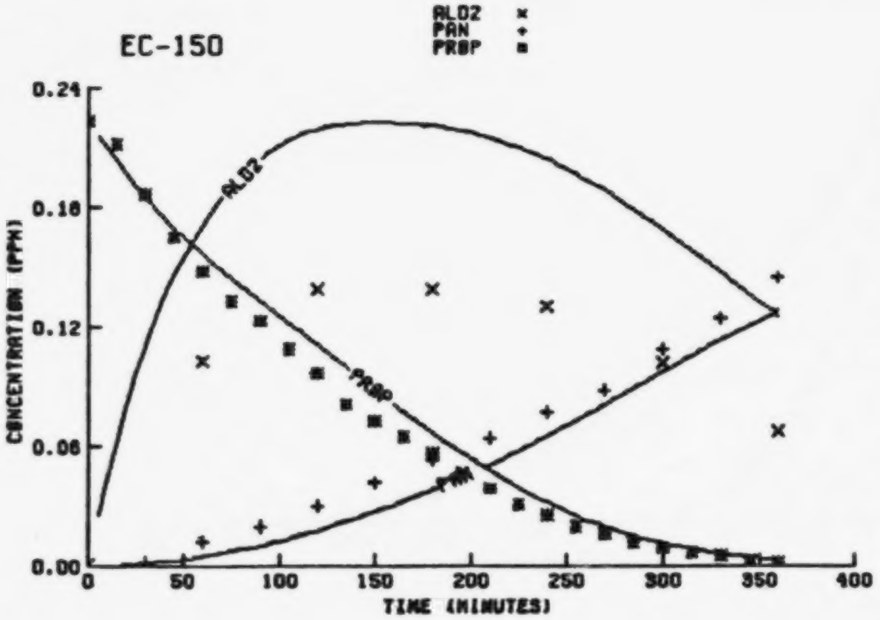

EC-149
FORM ■
0.32
0.24
0.16
0.08
0.00
CONCENTRATION (PPM)
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

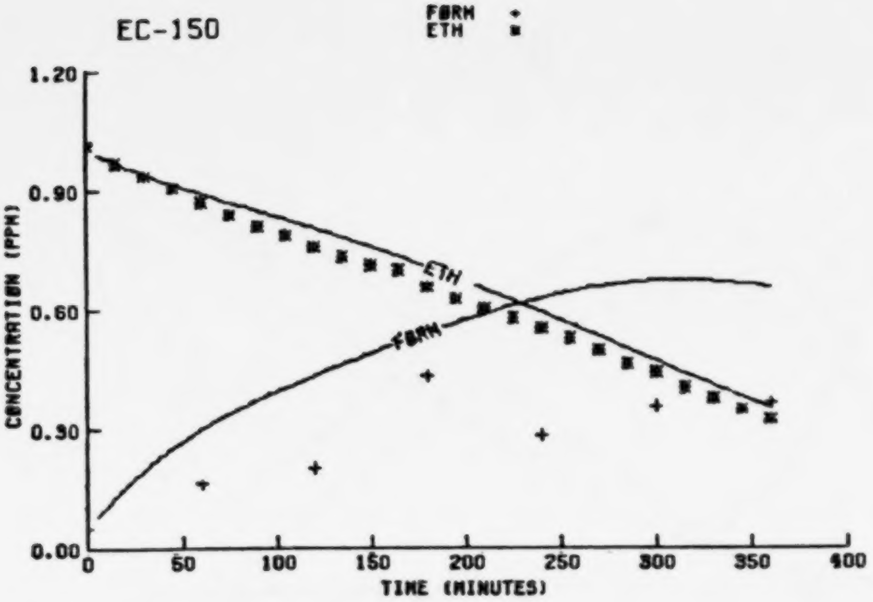

EC-149
MEK +
ALD3 ■
0.0048
0.0036
0.0024
0.0012
0.0000
CONCENTRATION (PPM)
MEK
ALD3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

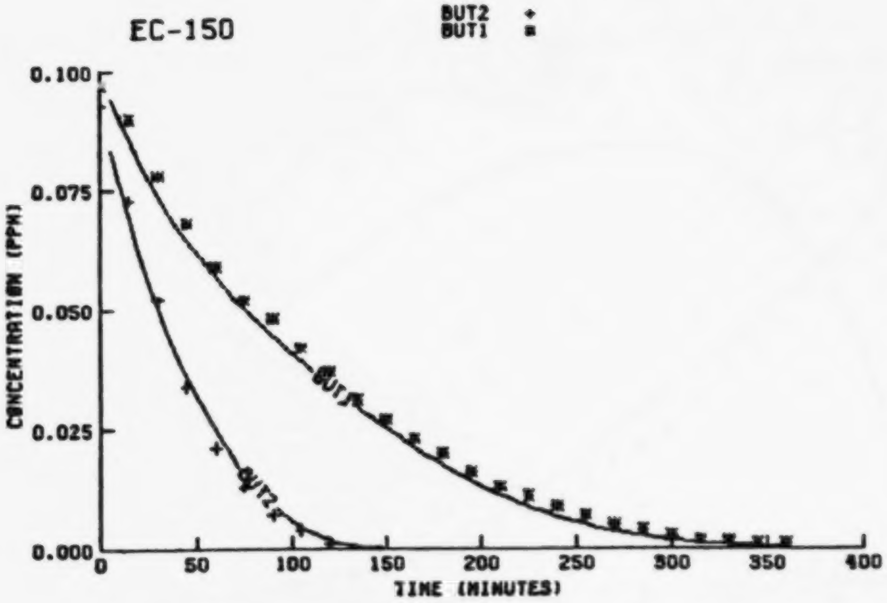

EC-149
MEN3 ■
0.0100
0.0075
0.0050
0.0025
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3

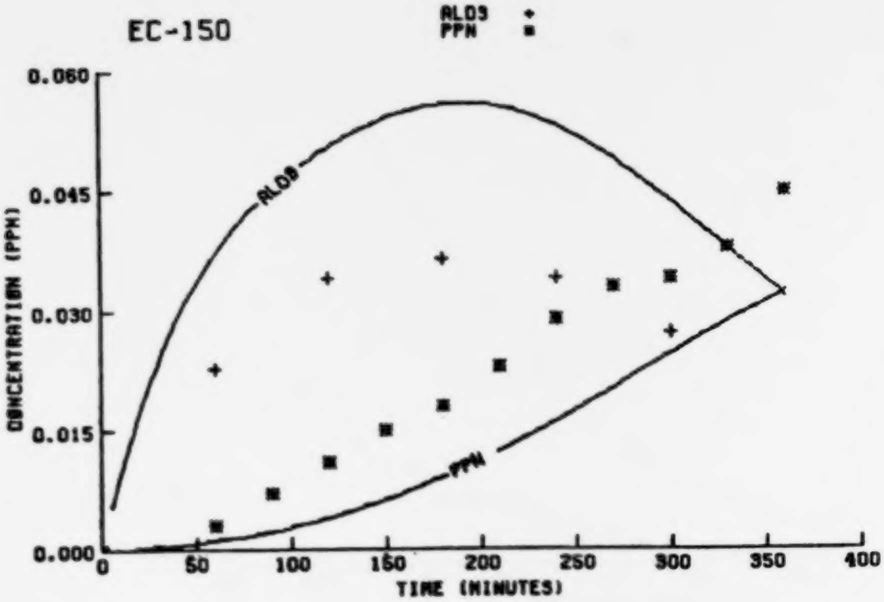
UCR MULTIOLEFIN EXPERIMENTS


EC-150
NO2 ×
NO +
O3 ■
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
O3

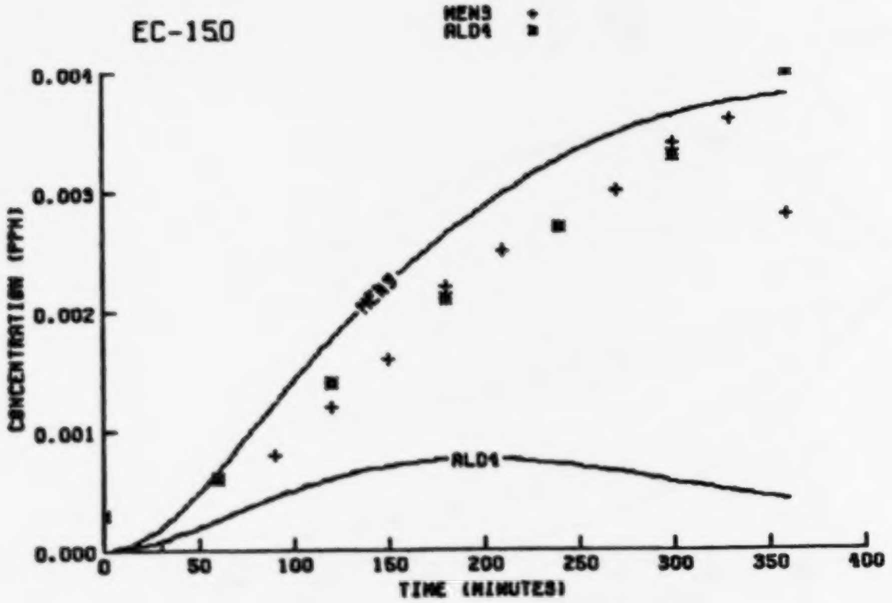

EC-150
ALD2 ×
PAN +
PROP ■
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PROP
PAN


EC-150
FORM +
ETH ⌘
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH
FORM

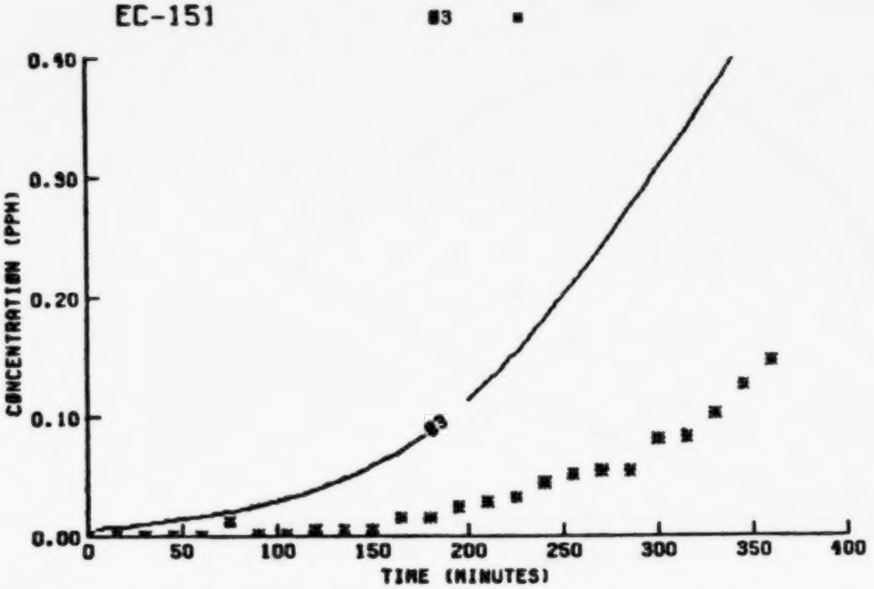

EC-150
BUT2 +
BUT1 ⌘
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT1
BUT2

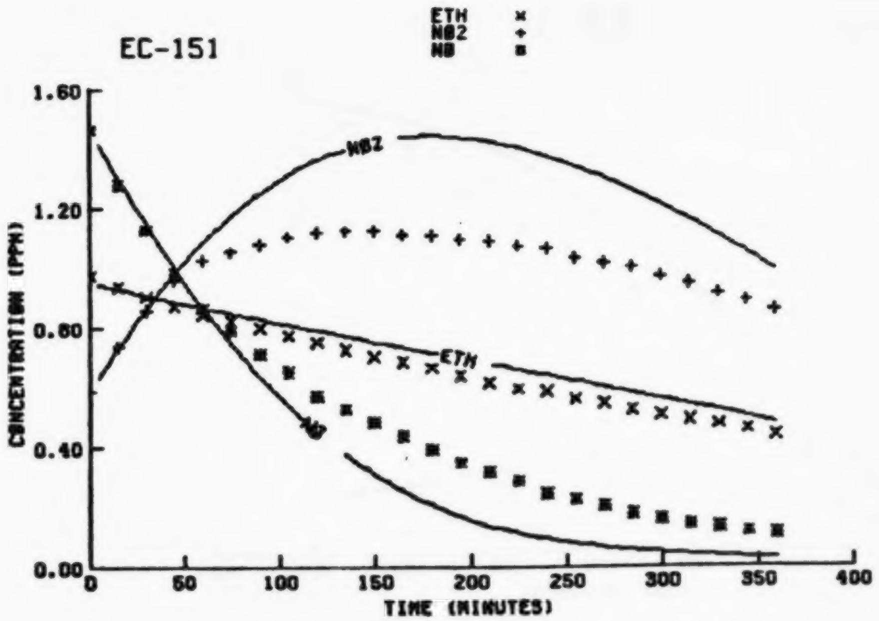


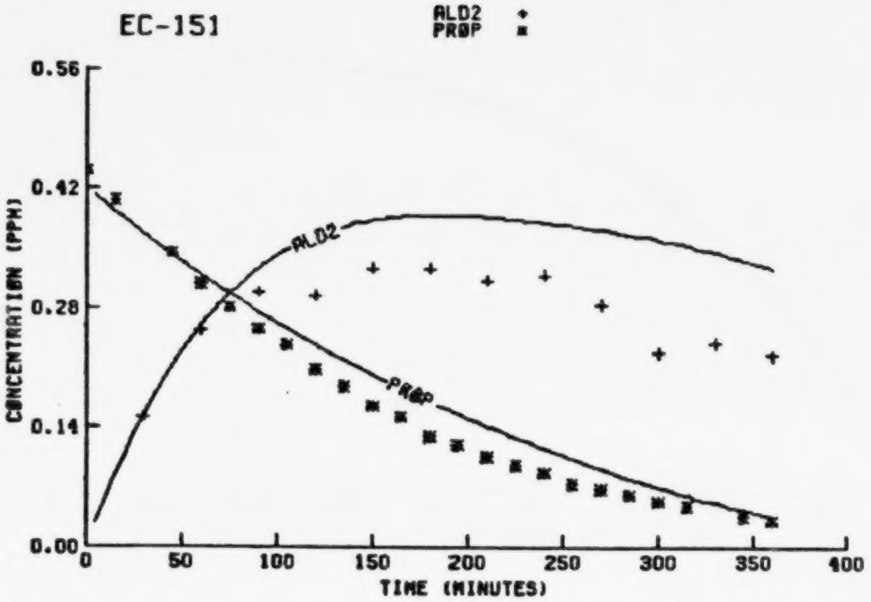
EC-150
ALD3 +
PPN ▪
0.060
0.045
0.030
0.015
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3
PPN

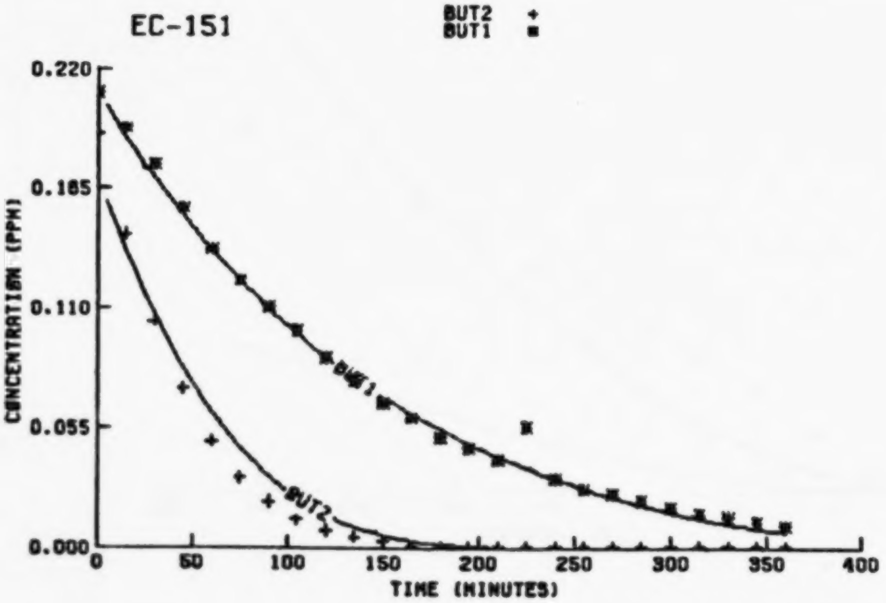


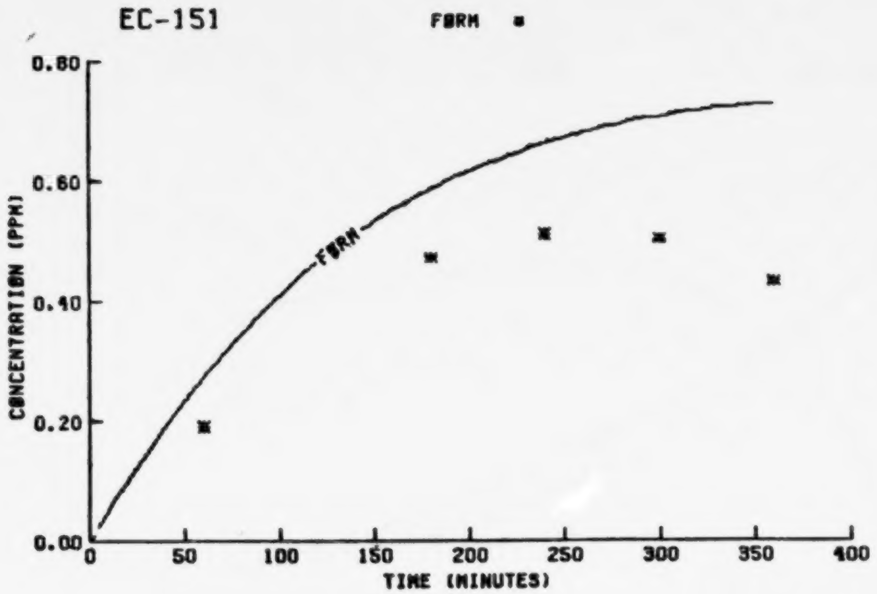
EC-150
MEN3 +
ALD4 ▪
0.004
0.003
0.002
0.001
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3
ALD4

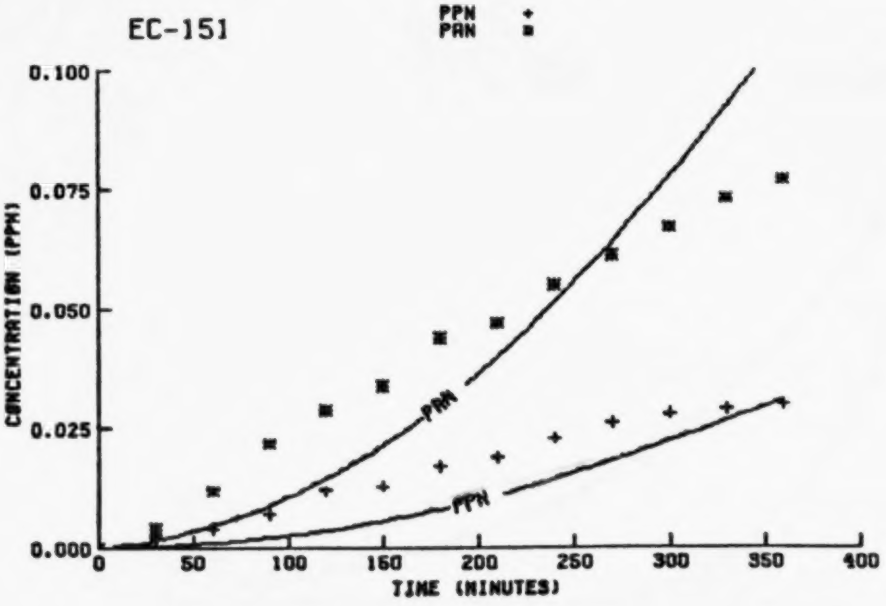

EC-151
O3
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

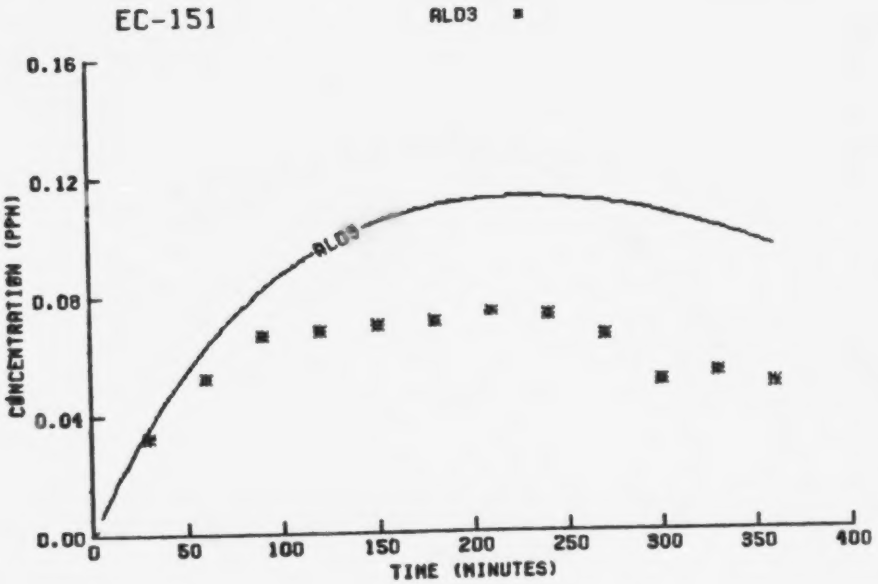

EC-151
ETH
NO2
NO
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
NO2
ETH
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

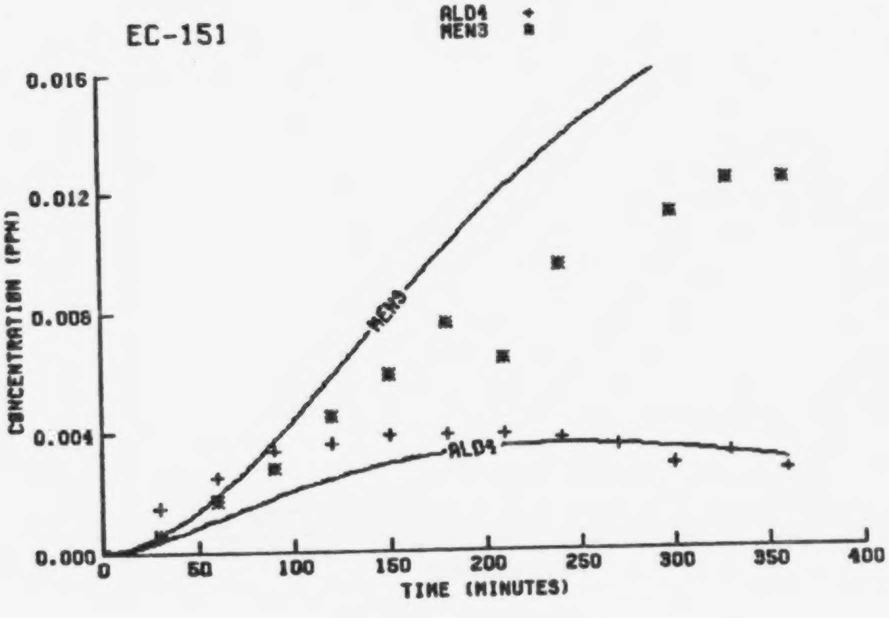

EC-151
ALD2 +
PRØP ✱
0.56
0.42
0.28
0.14
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PRØP

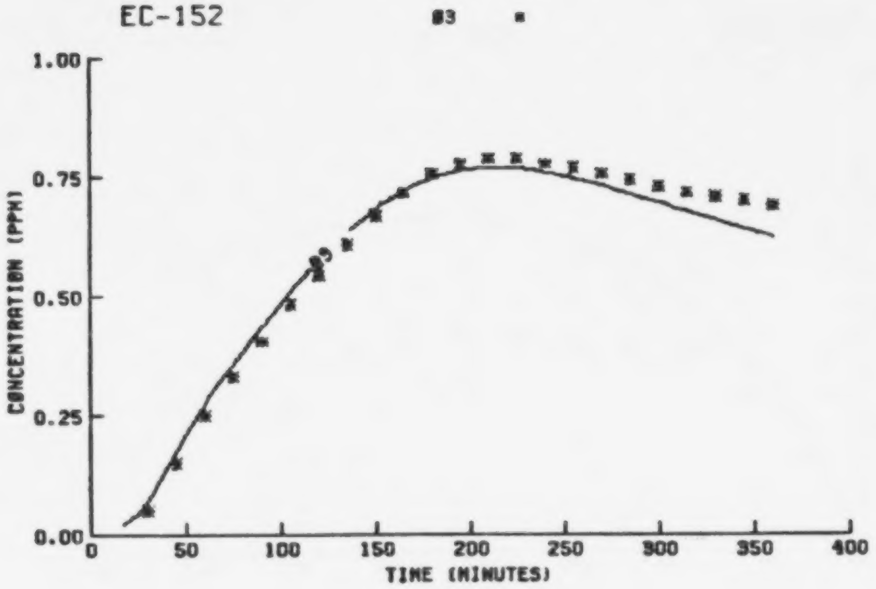

EC-151
BUT2 +
BUT1 ✱
0.220
0.165
0.110
0.055
0.000
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT1
BUT2


EC-151
FORM ■
CONCENTRATION (PPM)
0.80
0.60
0.40
0.20
0.00
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

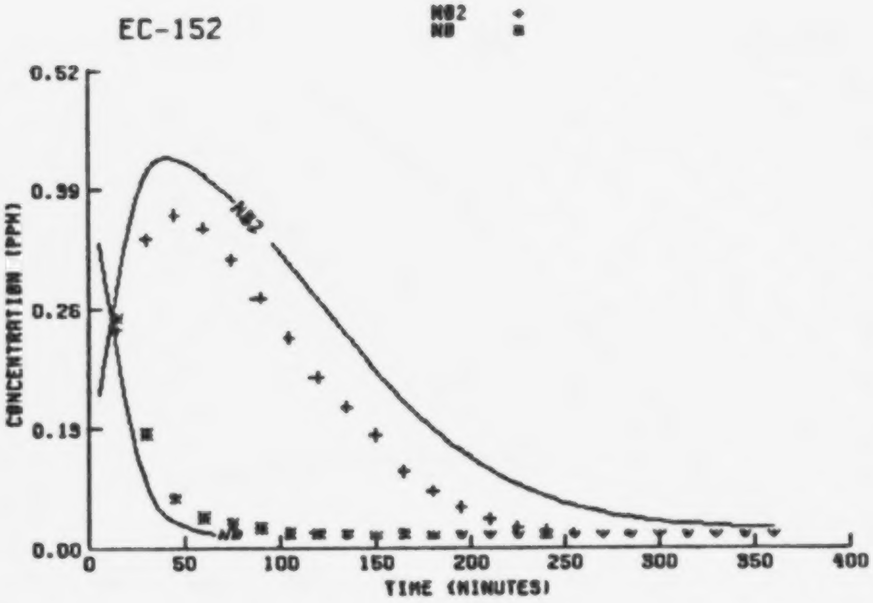

EC-151
PPN +
PAN ■
CONCENTRATION (PPM)
0.100
0.075
0.050
0.025
0.000
PAN
PPN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-151
ALO3
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALO3

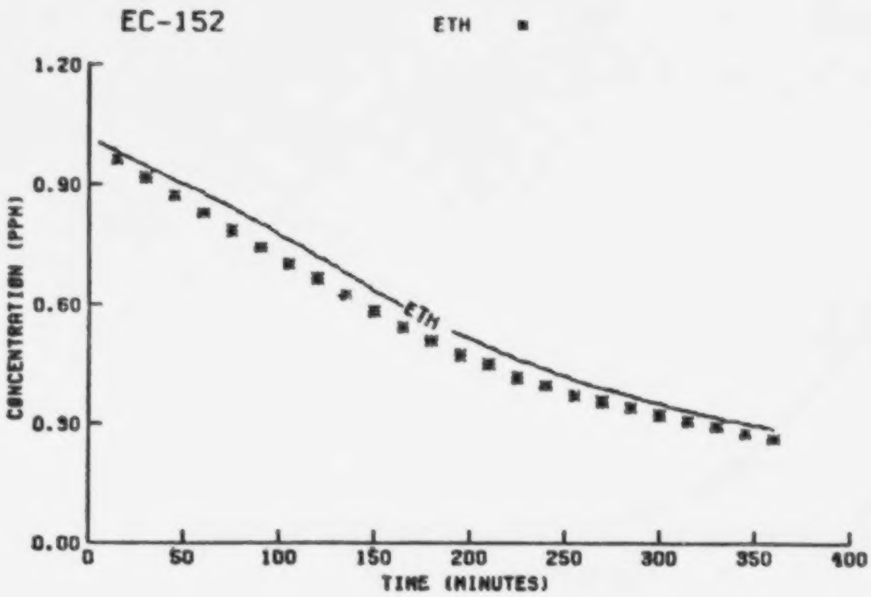

EC-151
ALD4
MEN3
0.016
0.012
0.008
0.004
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3
ALD4

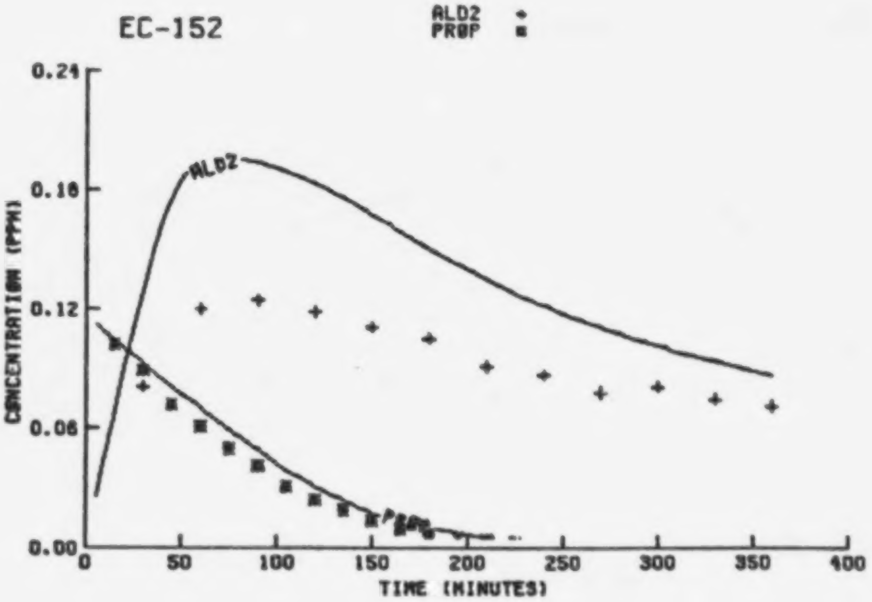


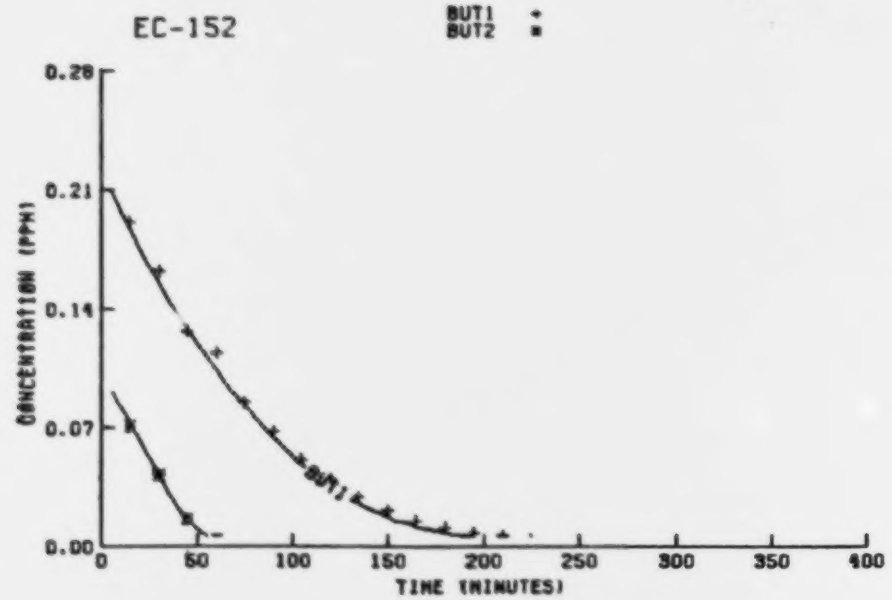
EC-152
O3 ×
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

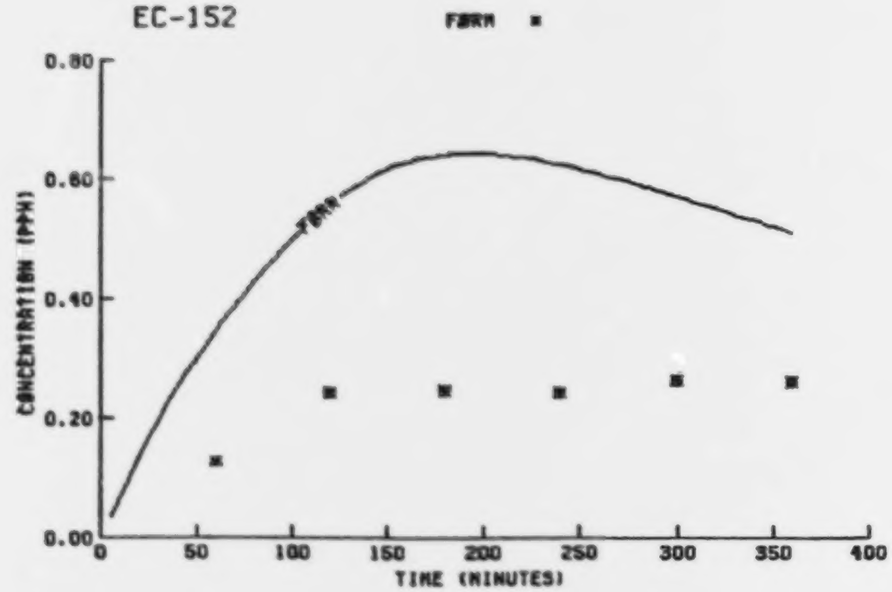


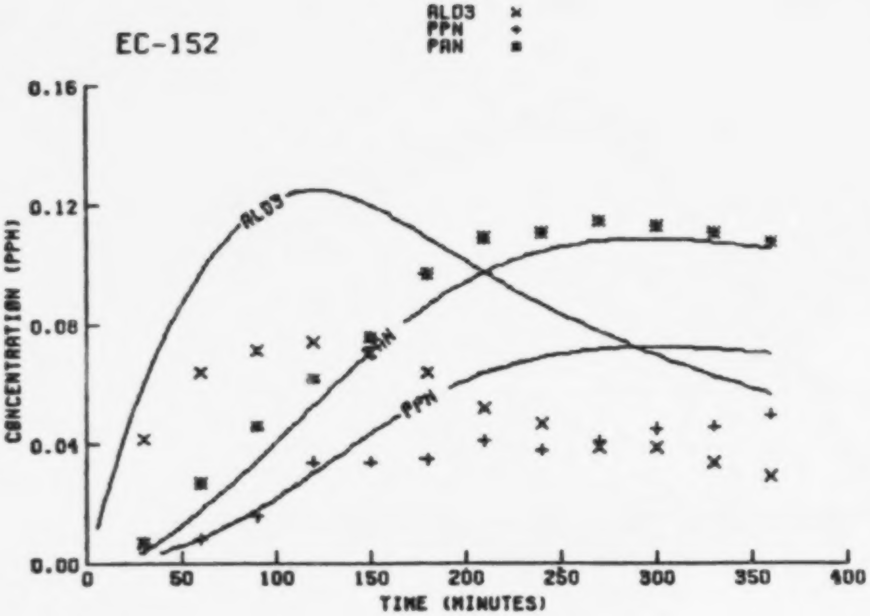
EC-152
NO2 +
NO ×
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

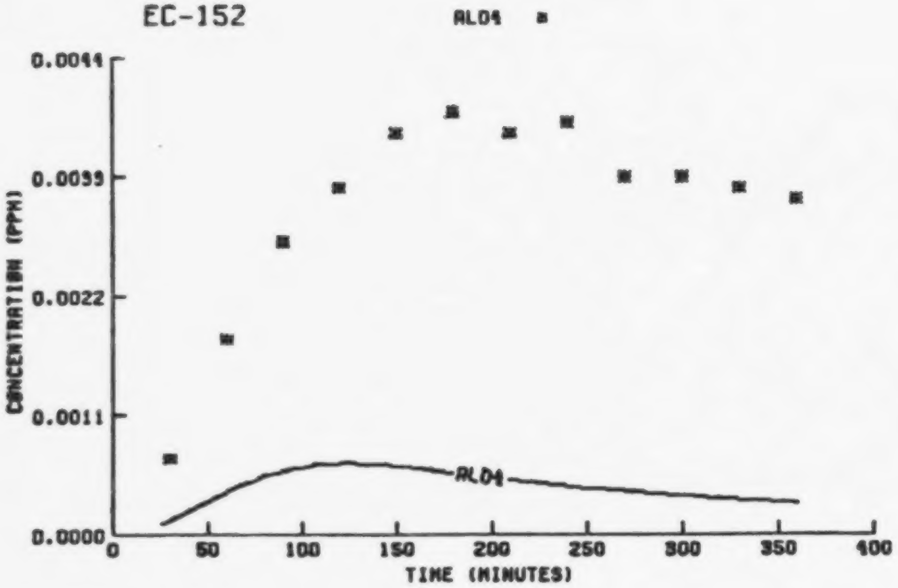

EC-152
ETH
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

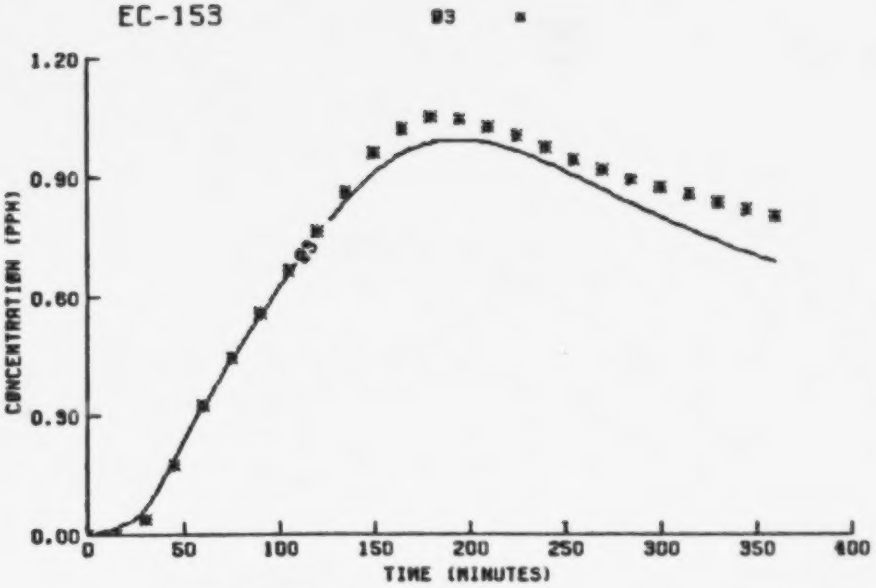

EC-152
ALD2 +
PROP
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PROP

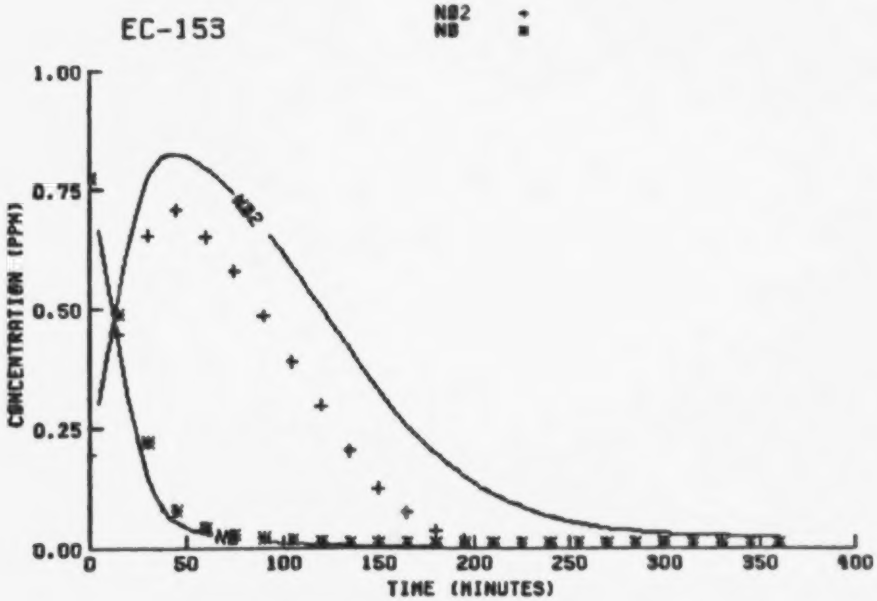

EC-152
BUT1 +
BUT2 ■
0.28
0.21
0.14
0.07
0.00
CONCENTRATION (PPM)
BUT1
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

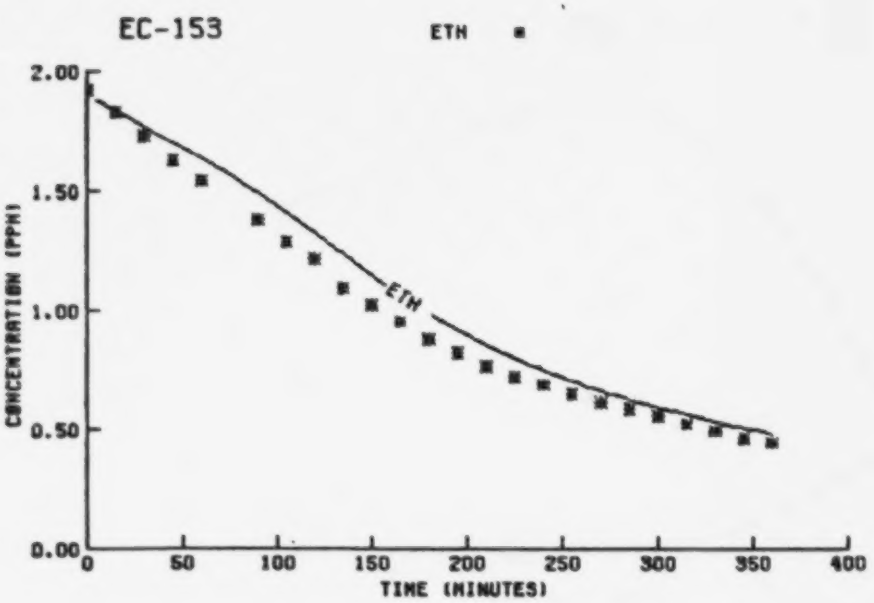

EC-152
FORM ■
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
FORM
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

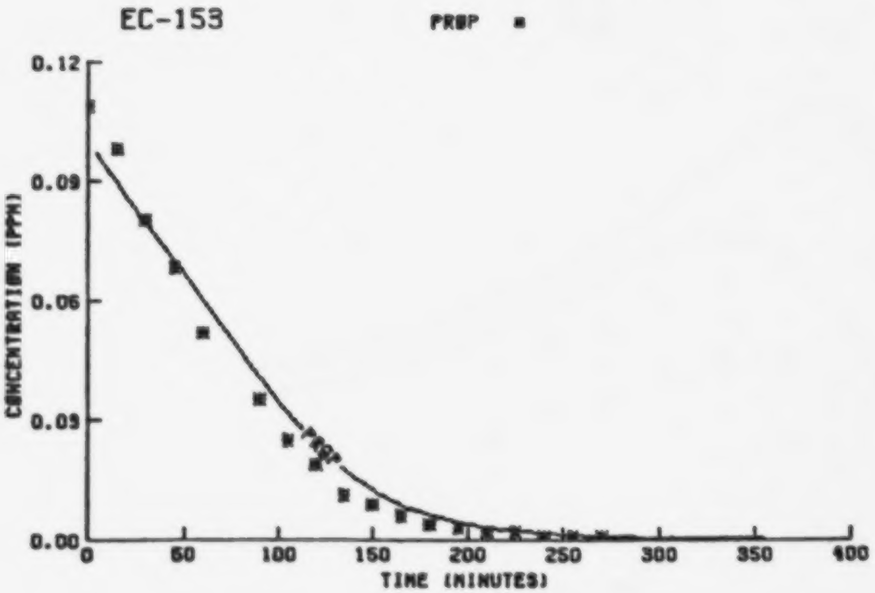

EC-152
ALD3 ×
PPN +
PAN ▪
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
ALD3
PAN
PPN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

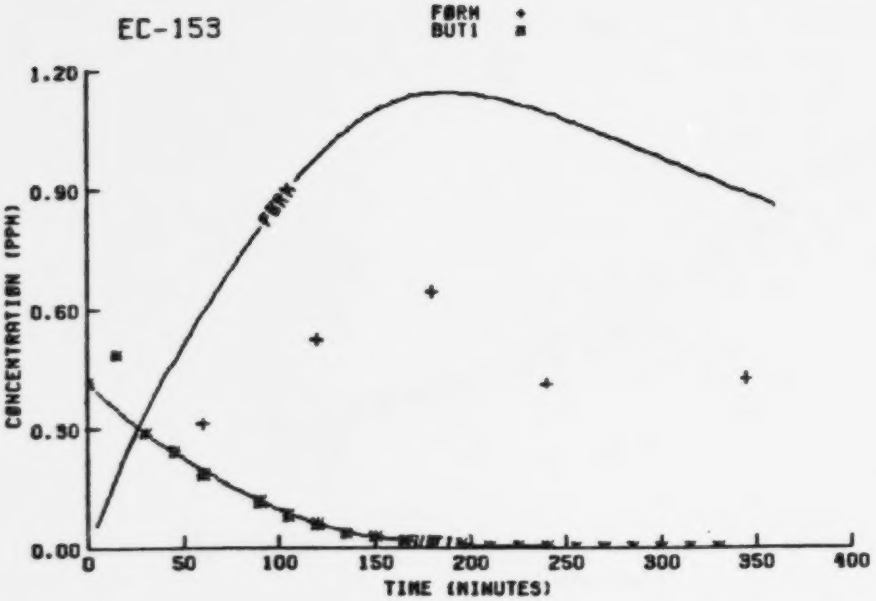

EC-152
ALD4 ▪
0.0044
0.0033
0.0022
0.0011
0.0000
CONCENTRATION (PPM)
ALD4
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

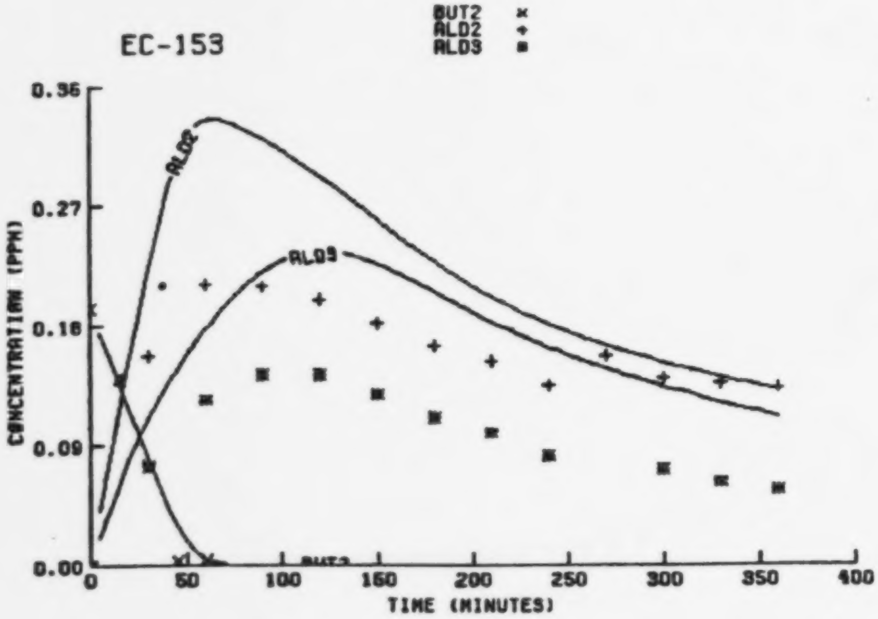

EC-153
O3 ✱
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

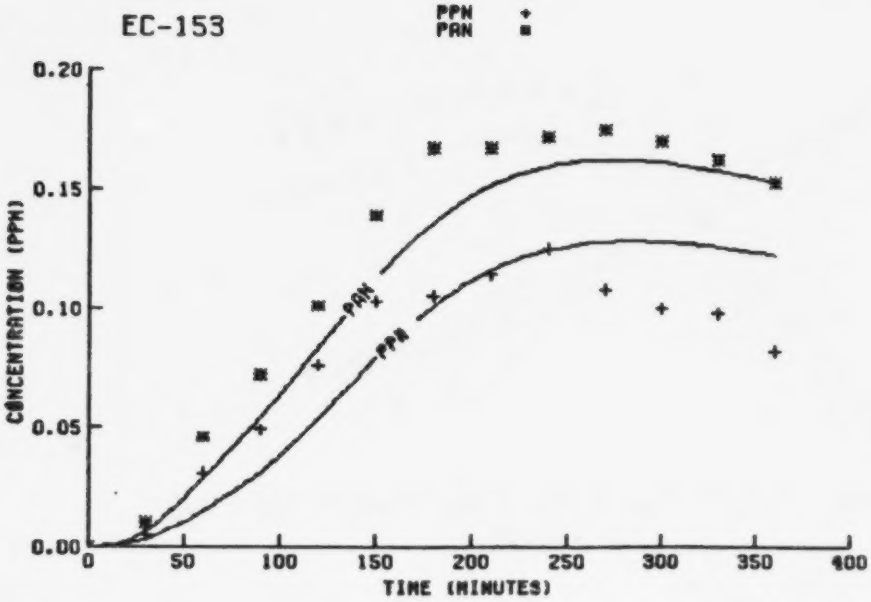

EC-153
NO2 +
NO ✱
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

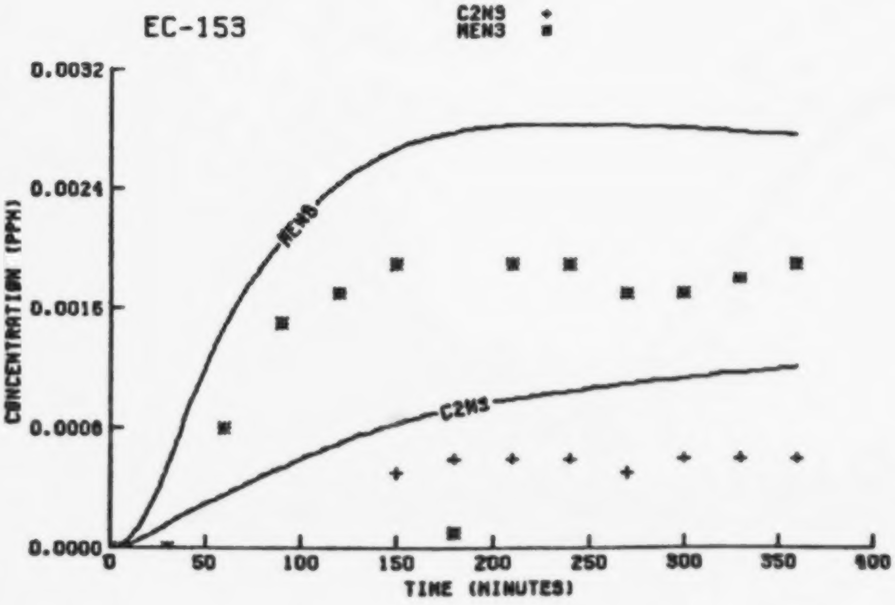

EC-153
ETH ■
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
ETH
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

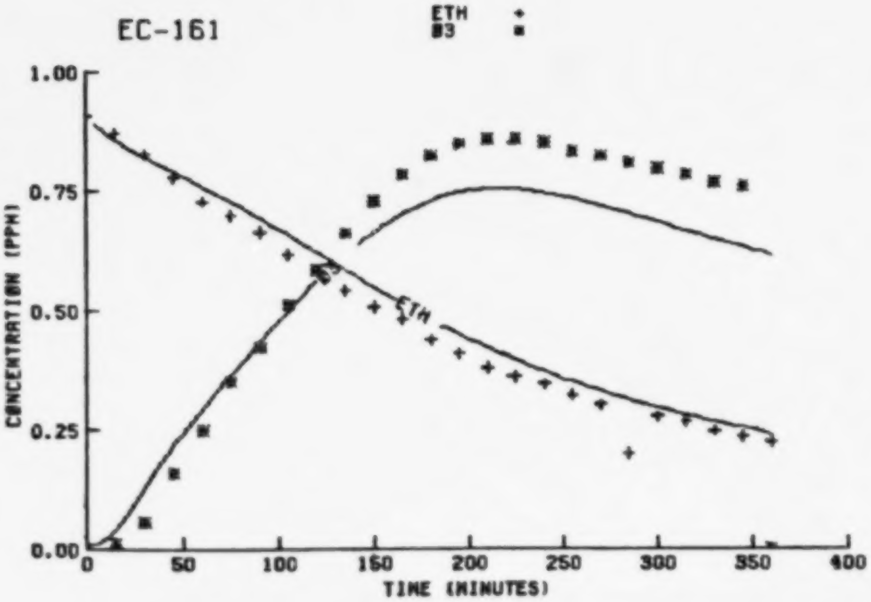

EC-153
PROP ■
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
PROP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

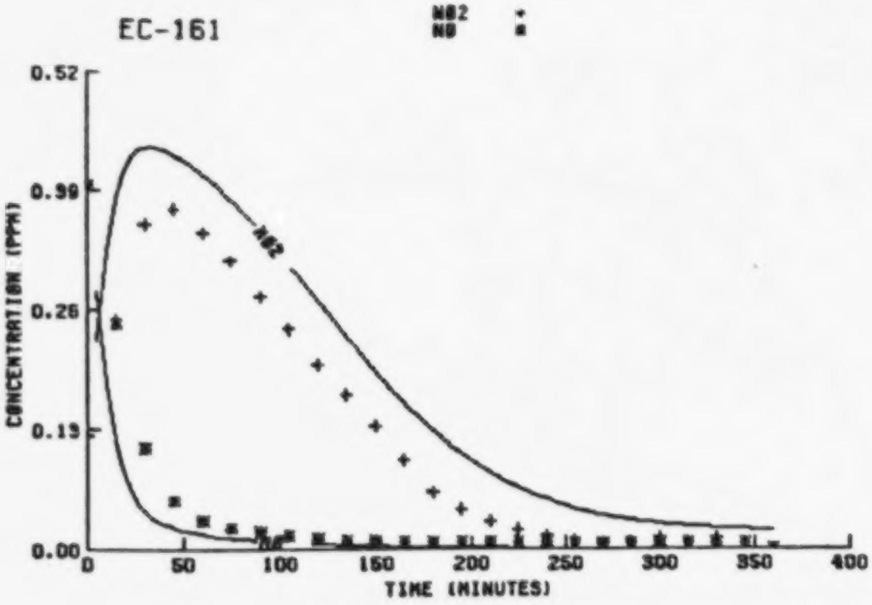

EC-153
FORM +
BUT1 ■
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM

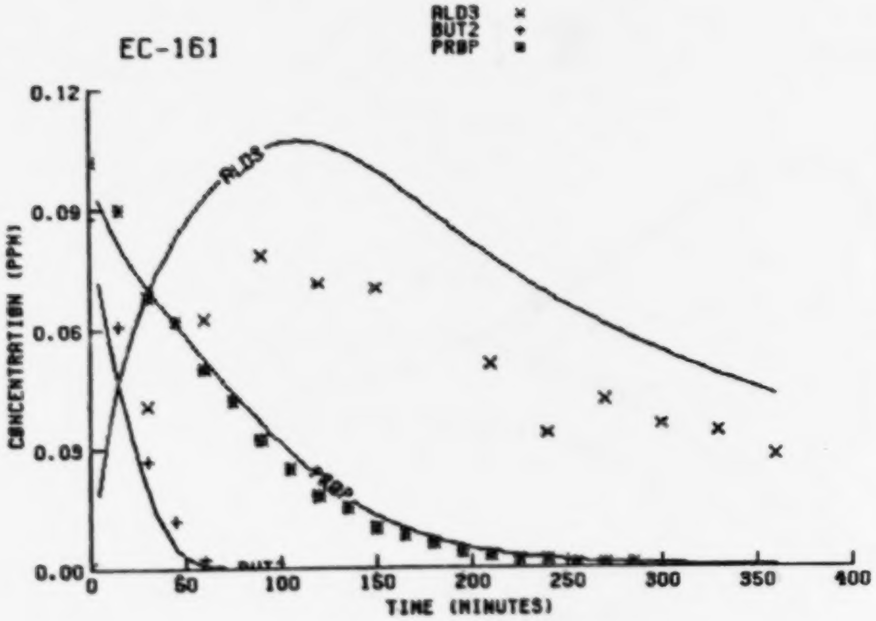

EC-153
BUT2 ×
ALD2 +
ALD3 ■
0.36
0.27
0.18
0.09
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
ALD3
BUT2

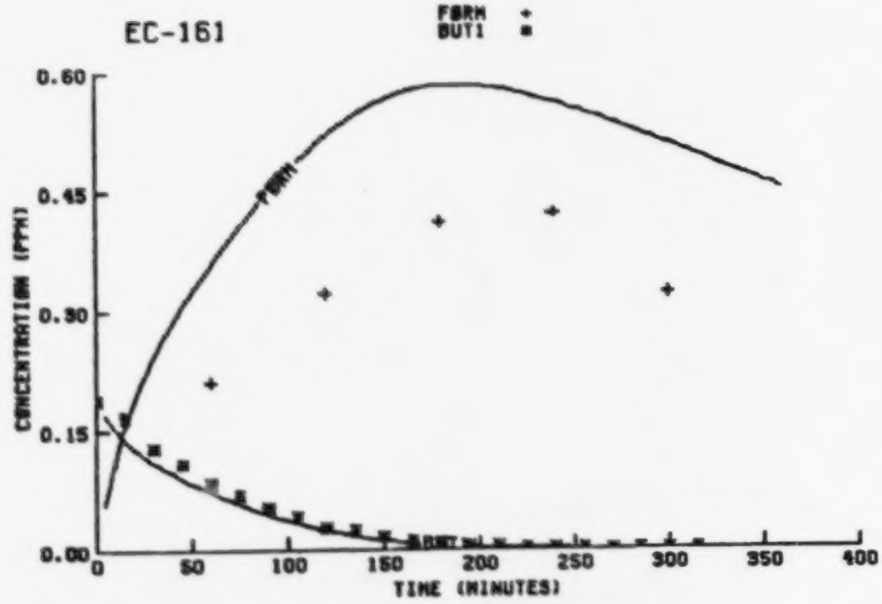

EC-153
PPN +
PAN ■
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN
PPN

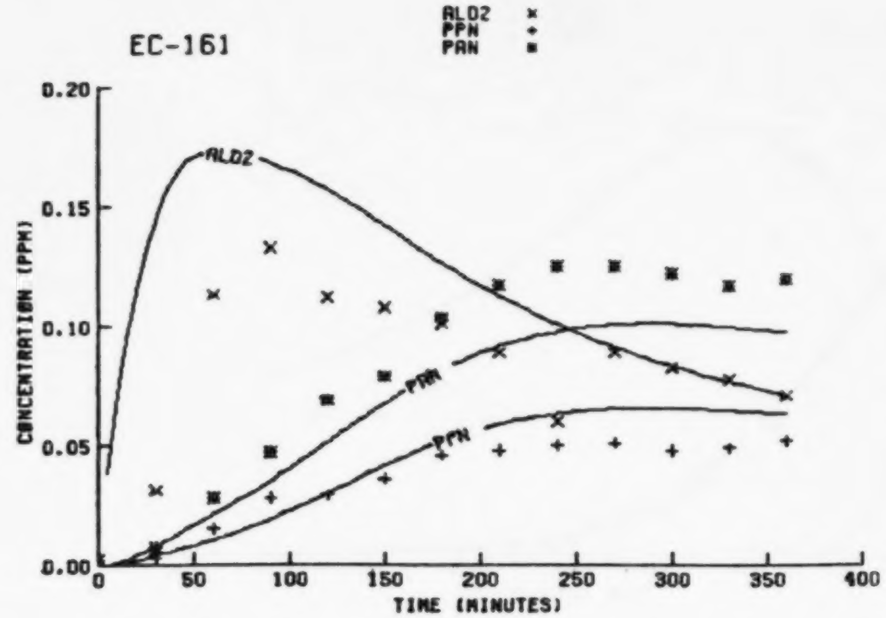

EC-153
C2N3 +
MEN3 ■
0.0032
0.0024
0.0016
0.0008
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3
C2N3

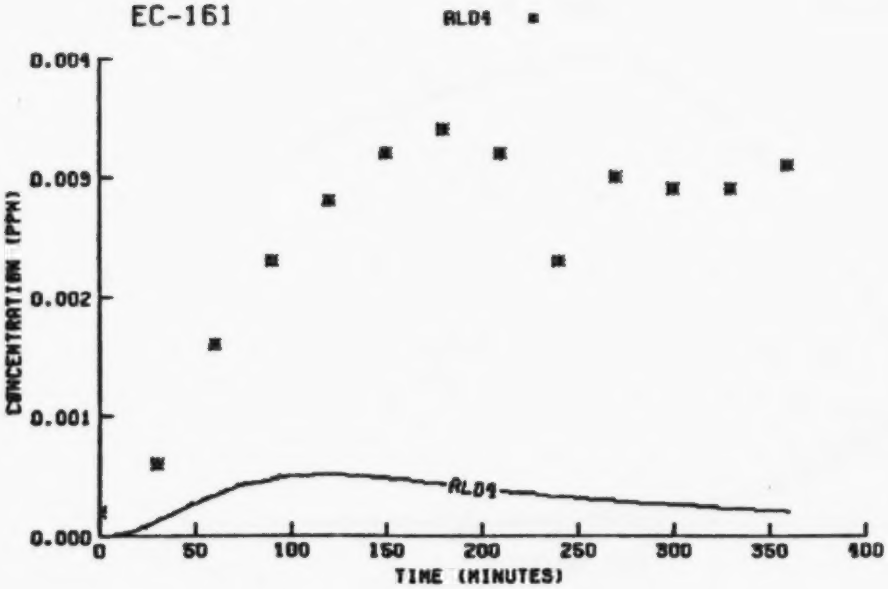

EC-161
ETH +
O3 *
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH
O3

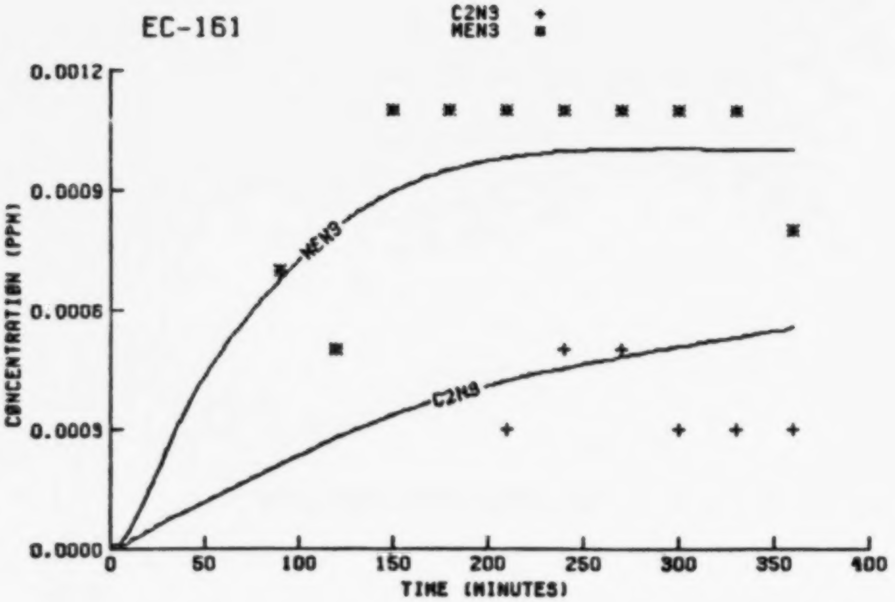

EC-161
NO2 +
NO *
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO


EC-161
ALD3 ×
BUT2 +
PROP ▪
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD3
PROP
BUT1


EC-161
FORM +
BUT1 ▪
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FORM
BUT1


EC-161
ALD2 ×
PPN +
PAN ▪
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD2
PAN
PPN

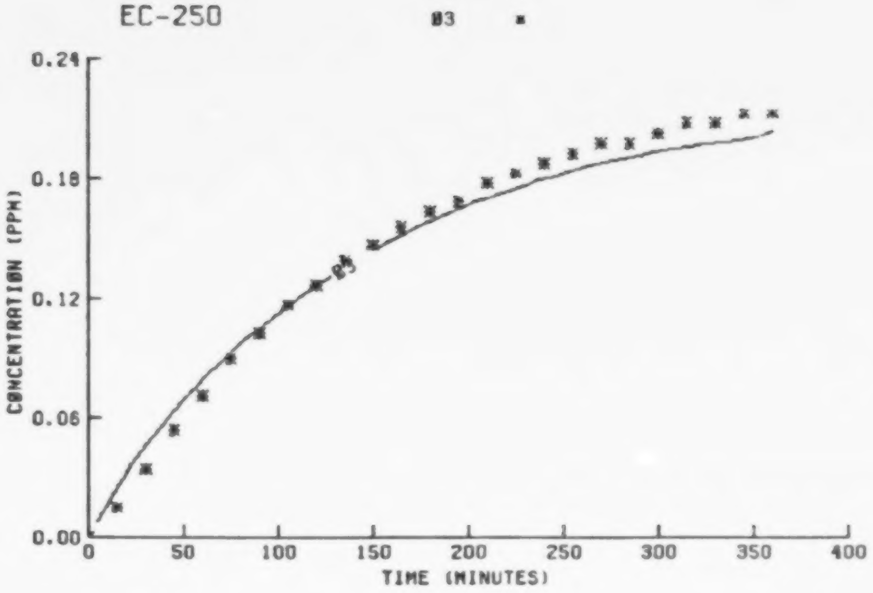

EC-161
ALD4 ▪
0.004
0.003
0.002
0.001
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ALD4

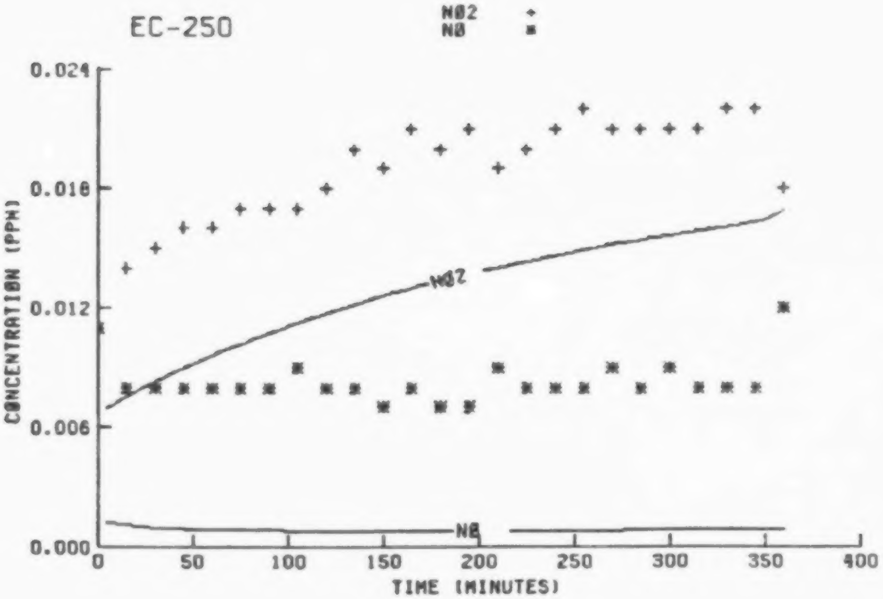

EC-161
C2N3 +
MEN3 ■
0.0012
0.0009
0.0006
0.0003
0.0000
CONCENTRATION (PPM)
MEN3
C2N3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

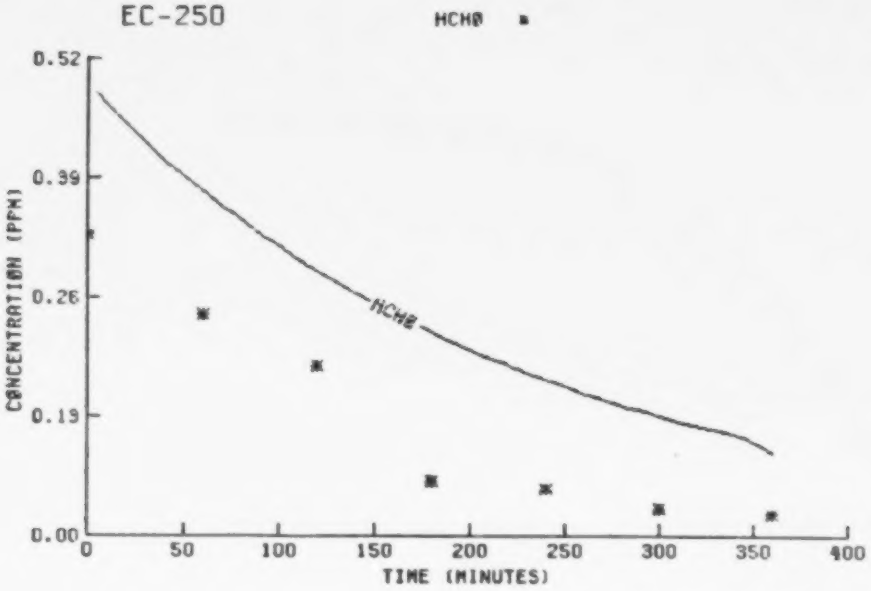
Part B

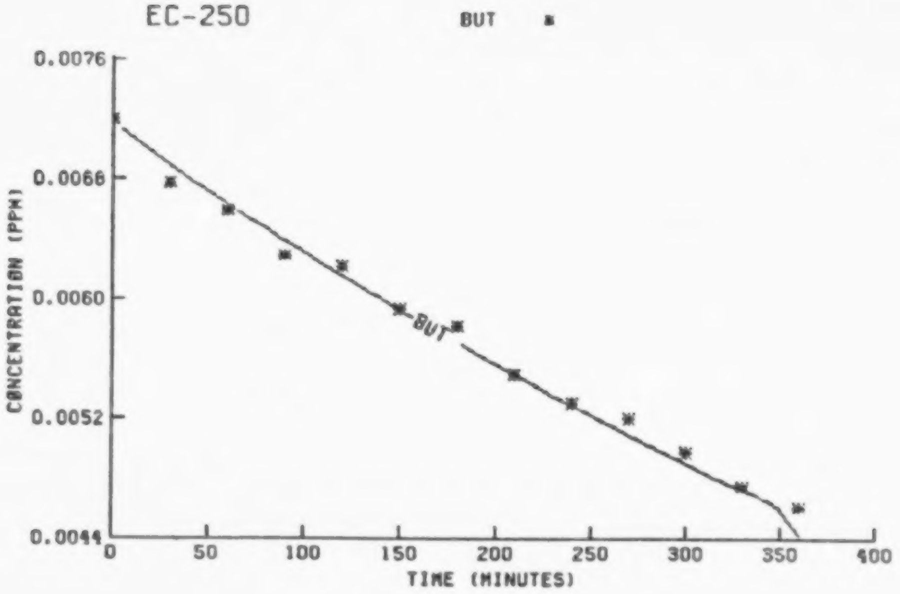
Simulation Results with the Carbon-Bond Mechanism

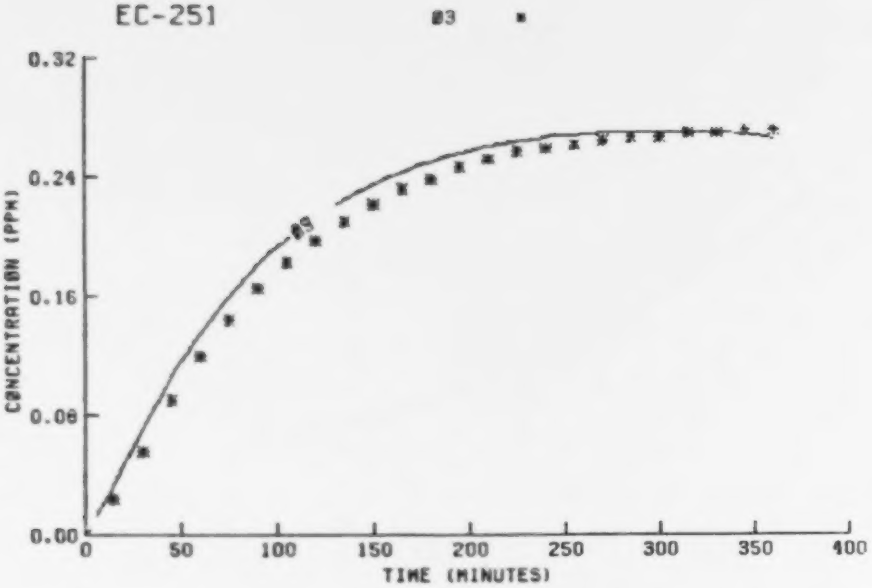
UCR FORMALDEHYDE EXPERIMENTS

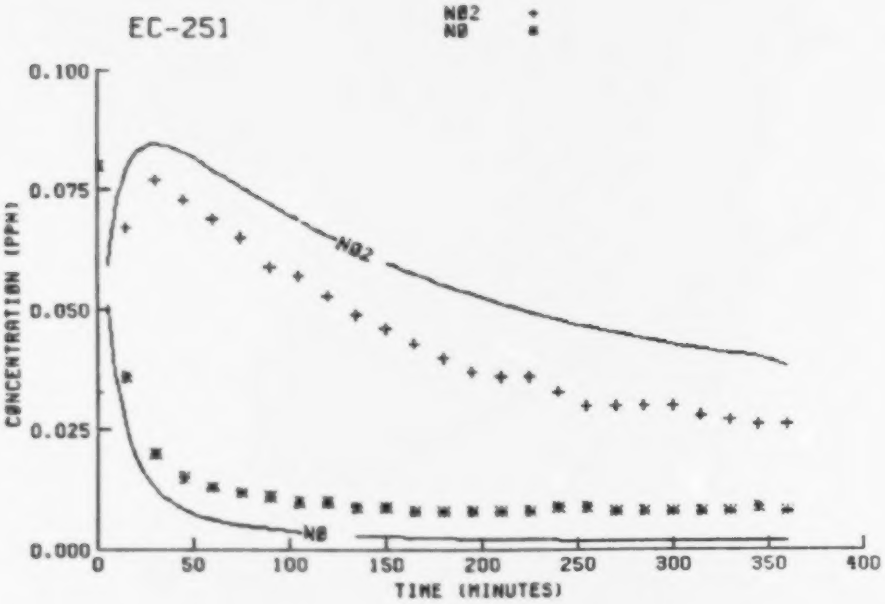

EC-250
O3
CONCENTRATION (PPM)
0.24
0.18
0.12
0.06
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3

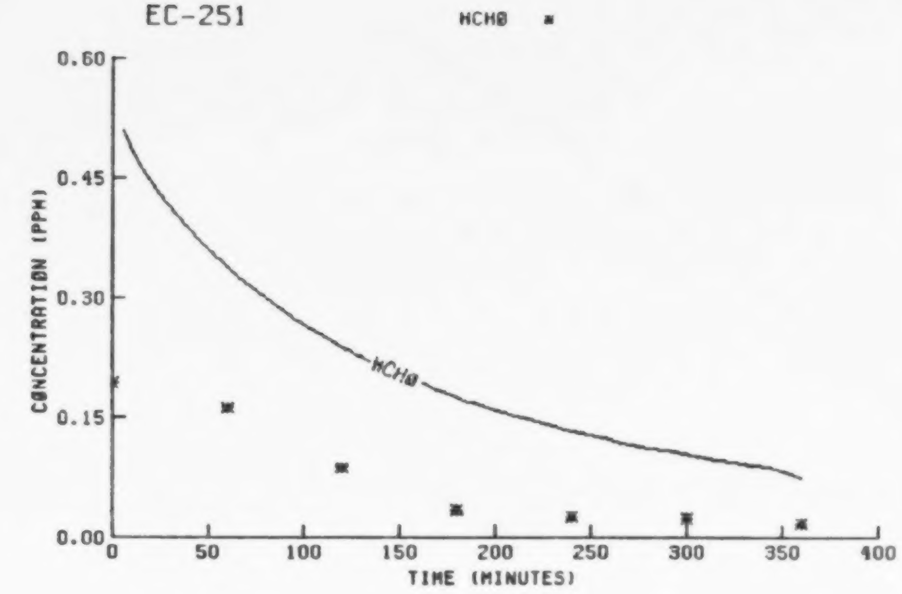

EC-250
NO2
NO
CONCENTRATION (PPM)
0.024
0.018
0.012
0.006
0.000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

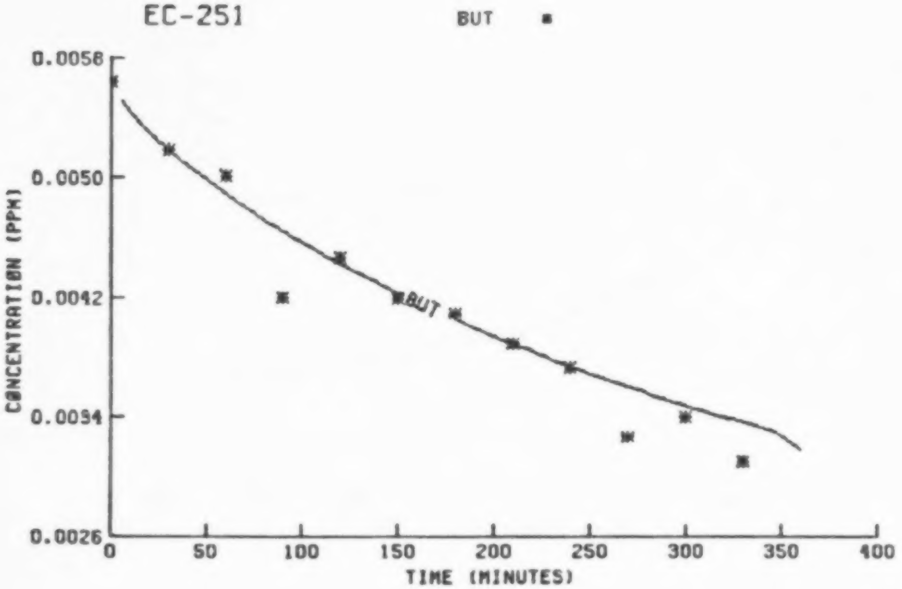

EC-250
HCHO *
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
HCHO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

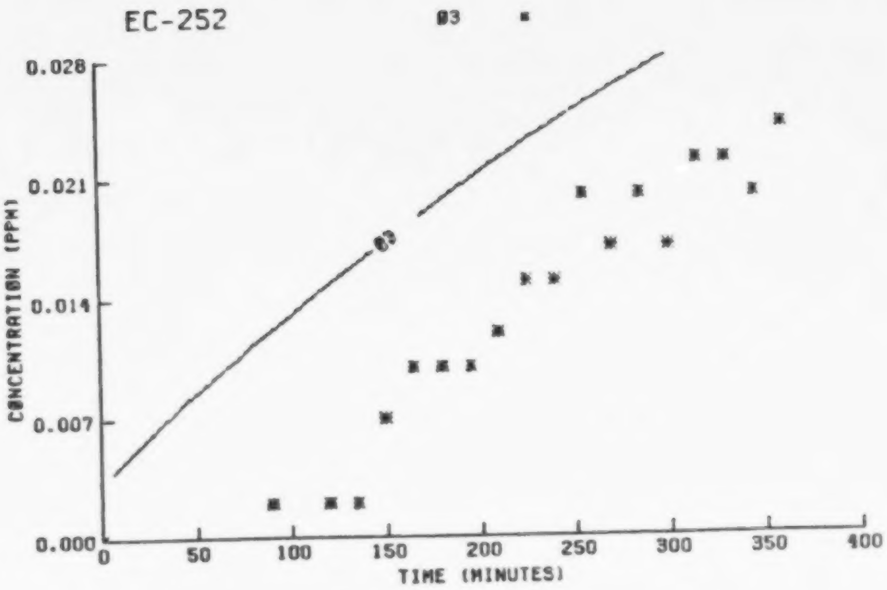

EC-250
BUT *
0.0076
0.0068
0.0060
0.0052
0.0044
CONCENTRATION (PPM)
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

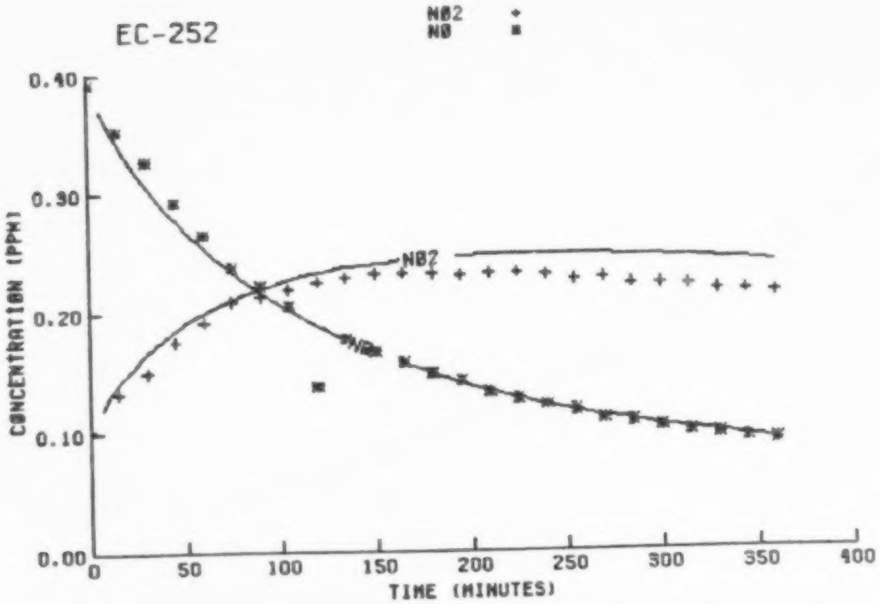

EC-251
Ø3 ✱
0.32
0.24
0.16
0.08
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ØS

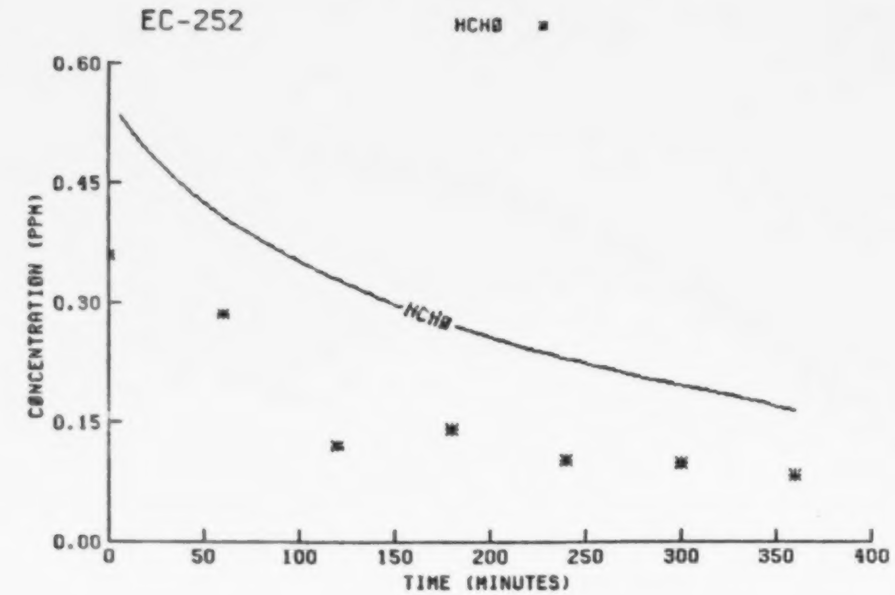

EC-251
NØ2 +
NØ ✱
0.100
0.075
0.050
0.025
0.000
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NØ2
NØ

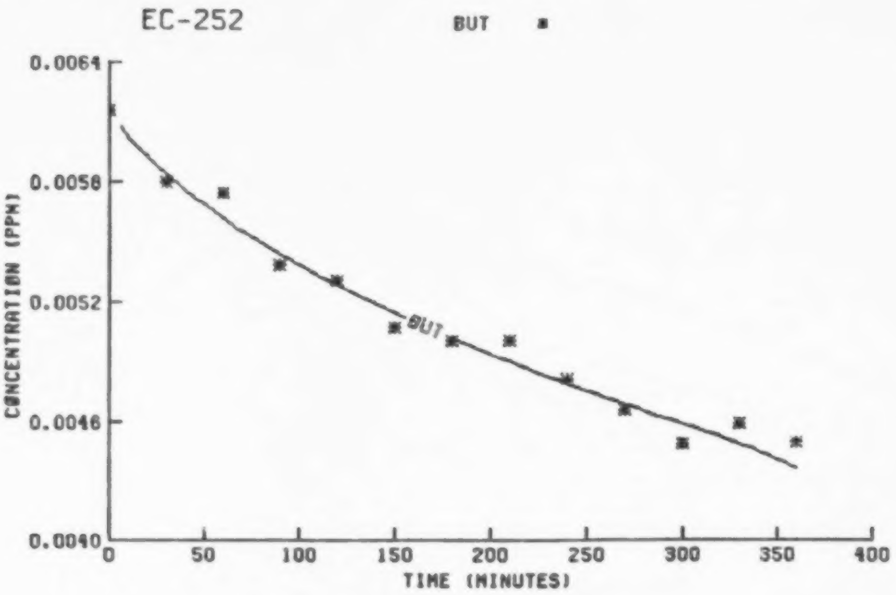

EC-251
HCHO *
CONCENTRATION (PPM)
0.60
0.45
0.30
0.15
0.00
HCHO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

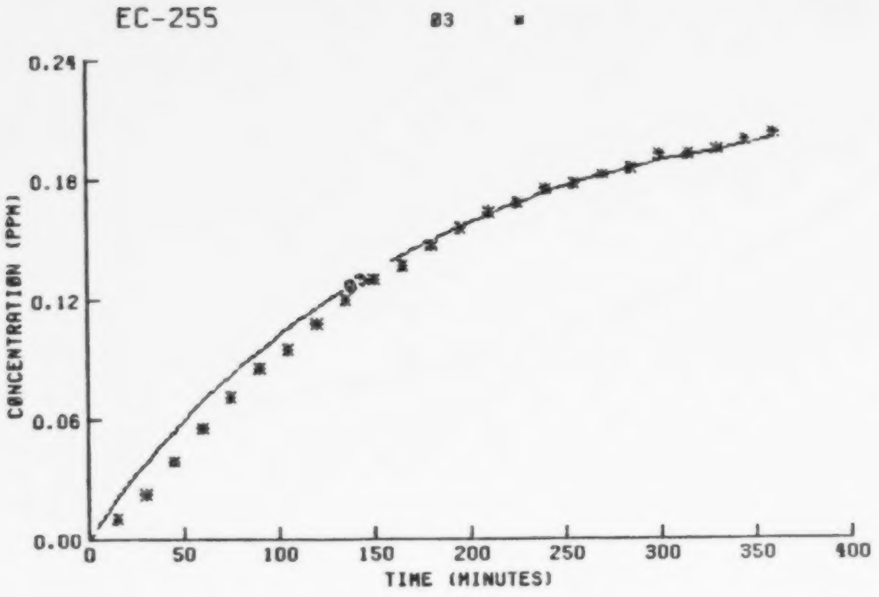

EC-251
BUT *
CONCENTRATION (PPM)
0.0058
0.0050
0.0042
0.0034
0.0026
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

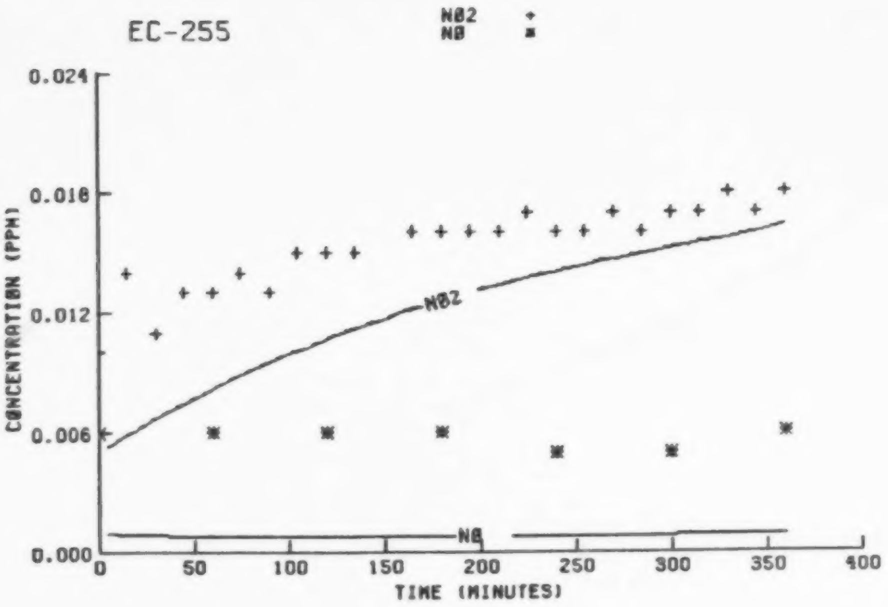

EC-252
O3 *
O3
0.028
0.021
0.014
0.007
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

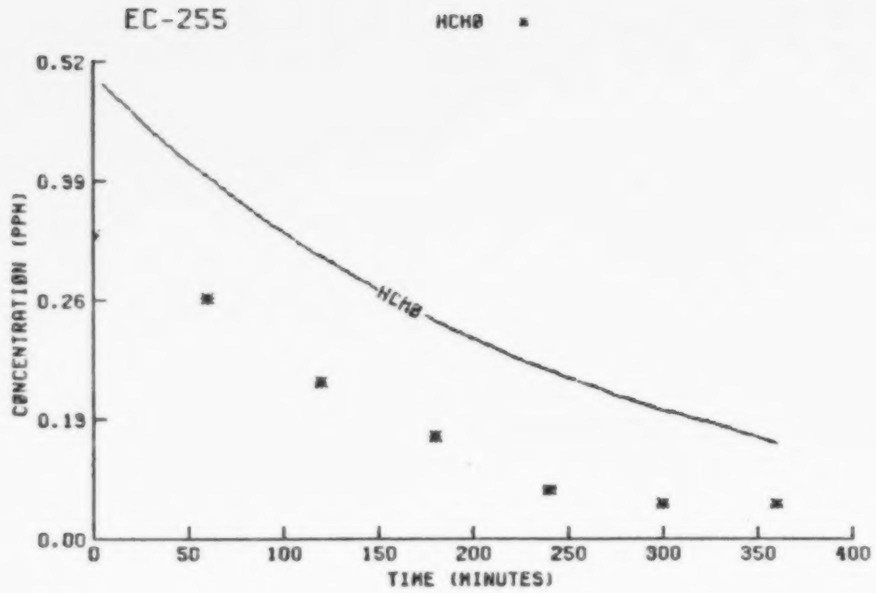

EC-252
NO2 +
NO *
NO2
NO
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

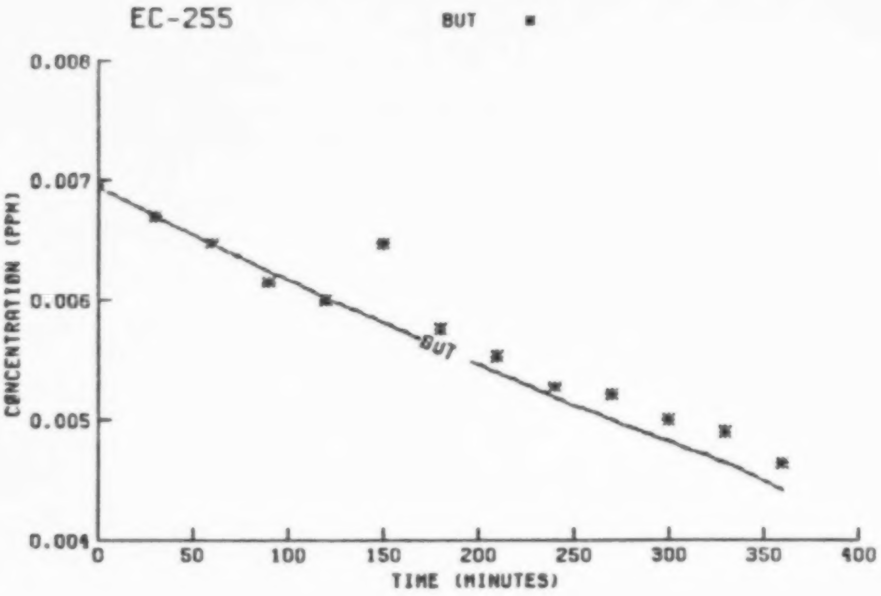

EC-252
HCHO ✱
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
HCHO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-252
BUT ✱
0.0064
0.0058
0.0052
0.0046
0.0040
CONCENTRATION (PPM)
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

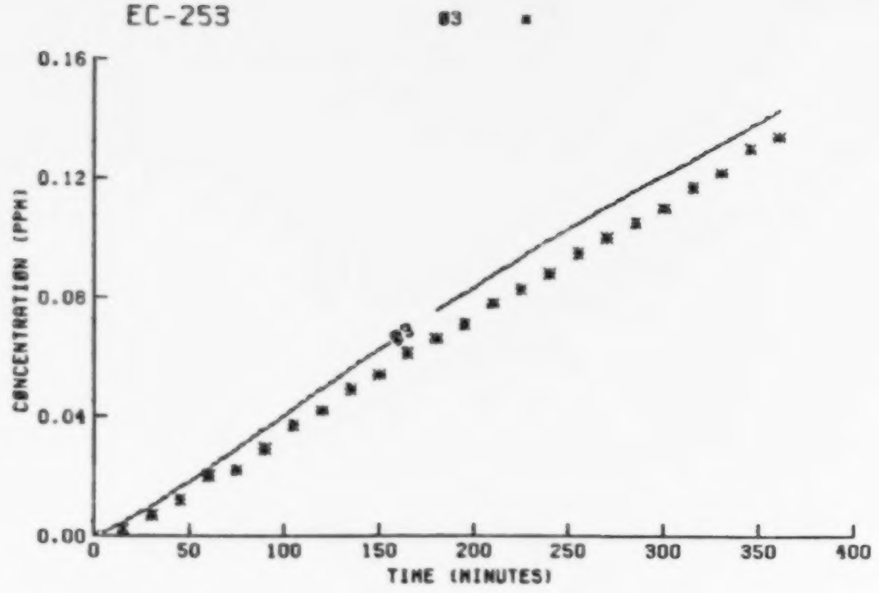

EC-255
O3 *
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3

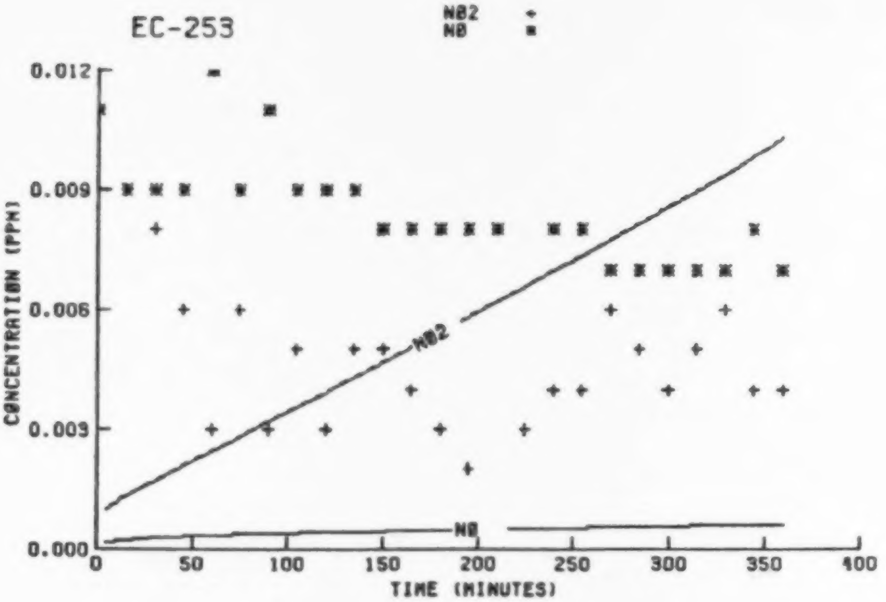

EC-255
NO2 +
NO *
0.024
0.018
0.012
0.006
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

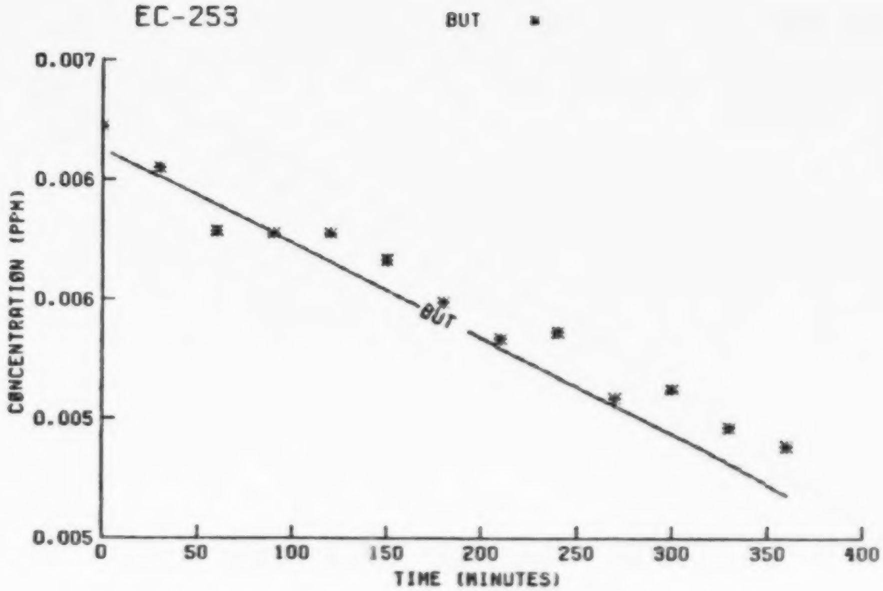

EC-255
HCHO *
CONCENTRATION (PPM)
0.52
0.39
0.26
0.13
0.00
HCHO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

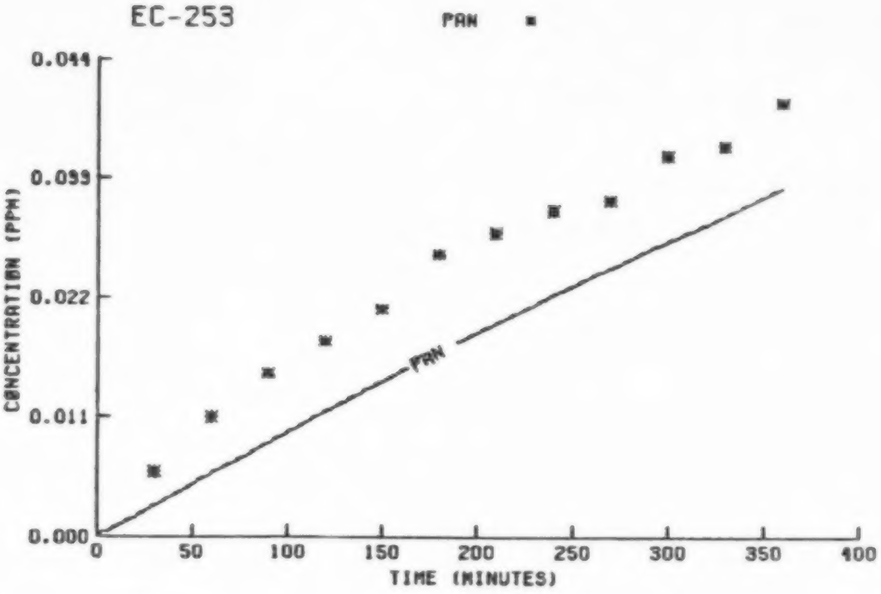

EC-255
BUT *
CONCENTRATION (PPM)
0.008
0.007
0.006
0.005
0.004
BUT
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

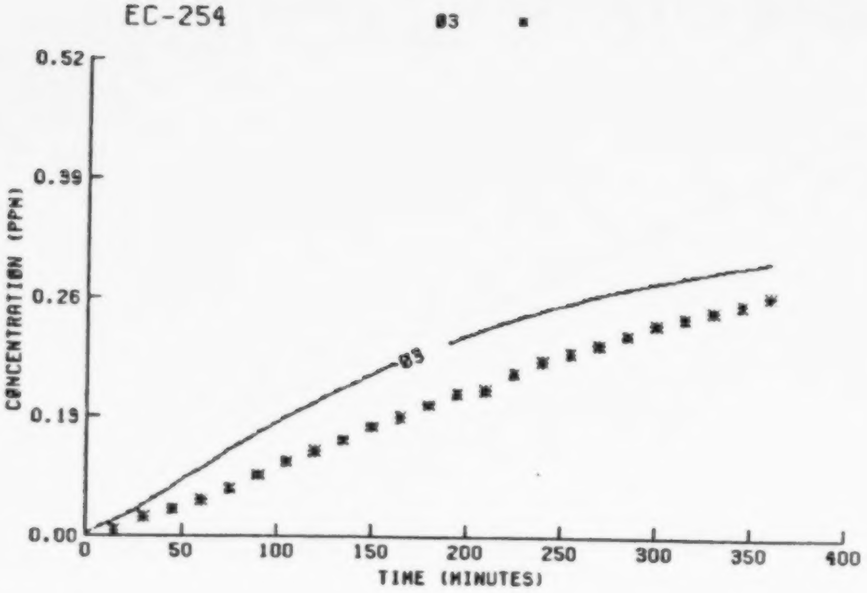
UCR ACETALDEHYDE EXPERIMENTS

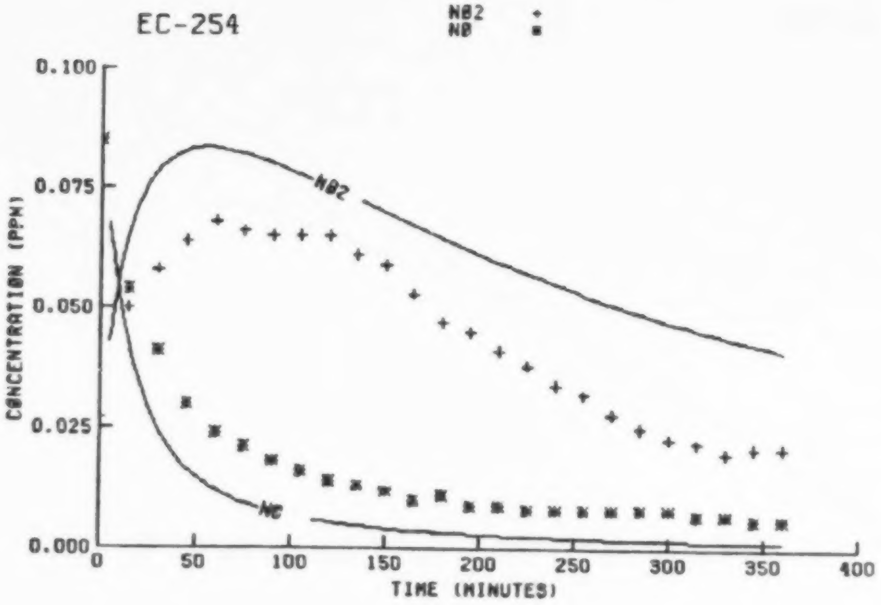

EC-253
O3 *
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

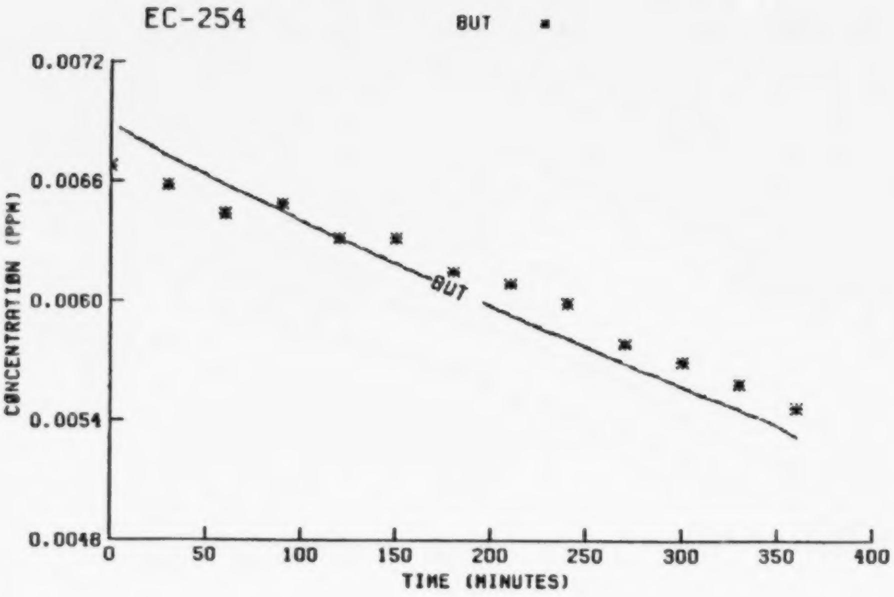

EC-253
NO2 +
NO *
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

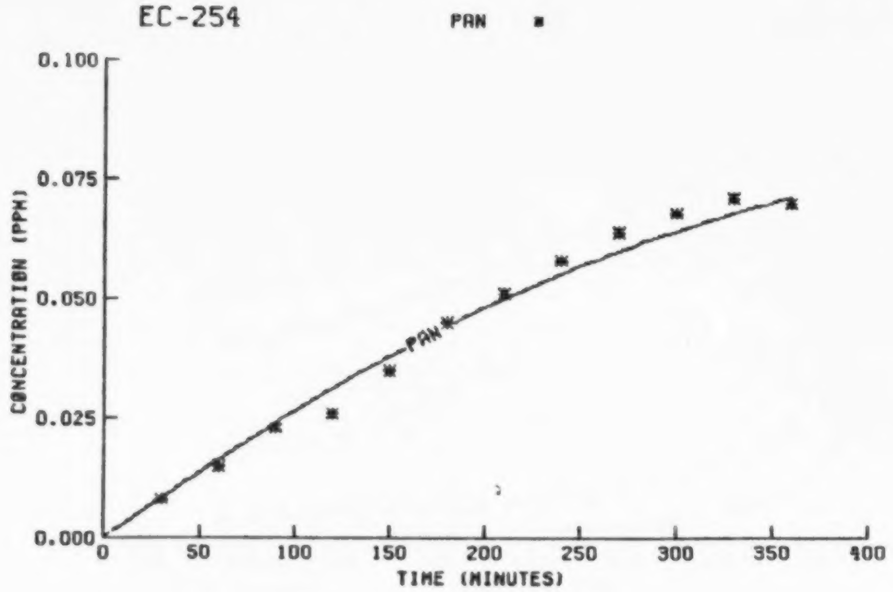

EC-253
BUT
0.007
0.006
0.006
0.005
0.005
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
BUT


EC-253
PAN
0.044
0.033
0.022
0.011
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

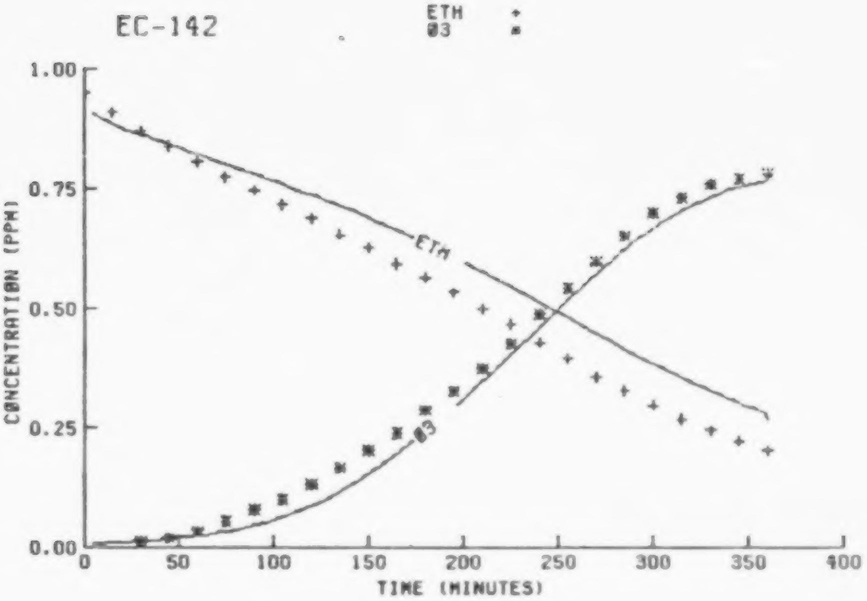

EC-254
O3 ✱
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

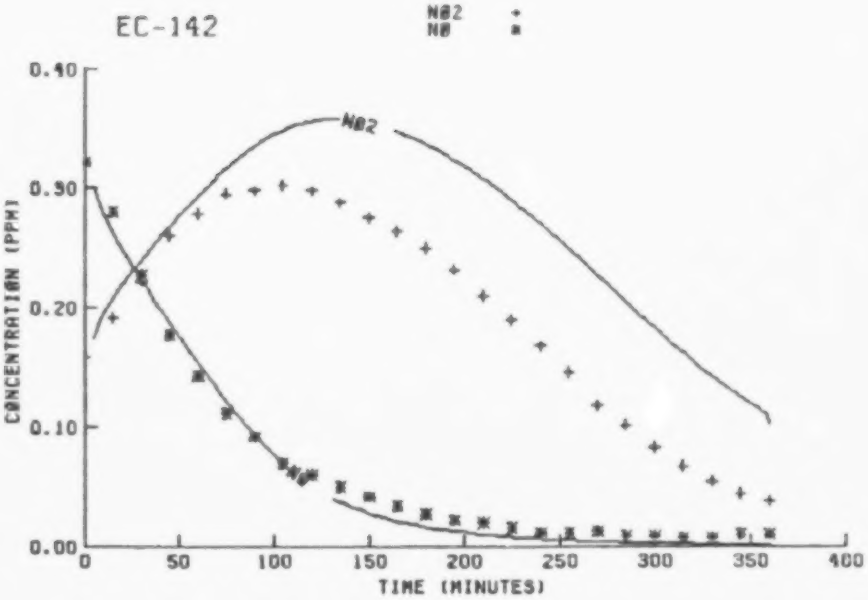

EC-254
NO2 +
NO ✱
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

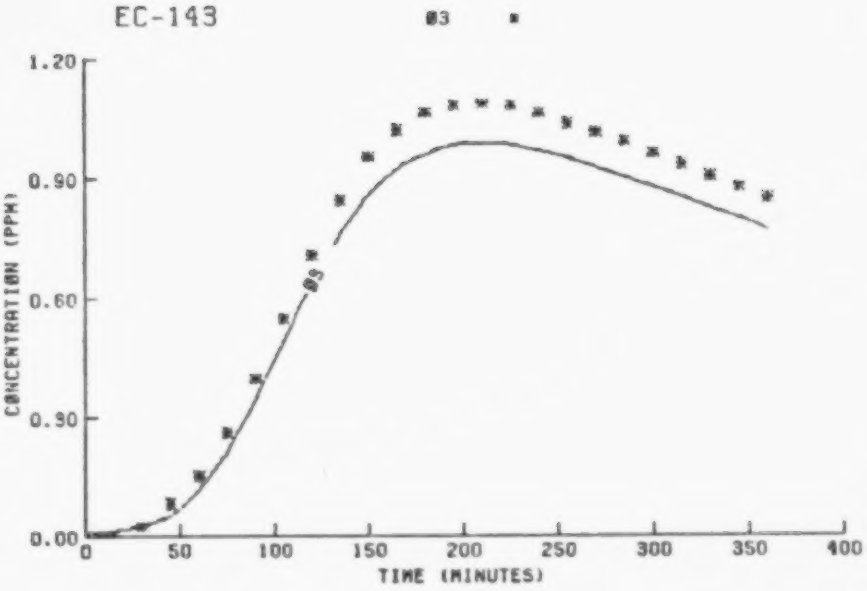

EC-254
BUT
0.0072
0.0066
0.0060
0.0054
0.0048
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

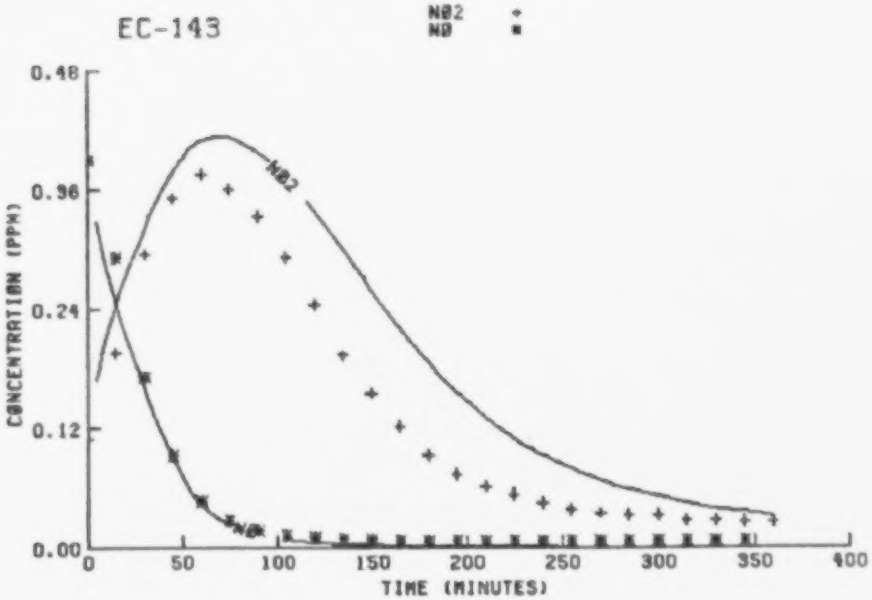

EC-254
PAN
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

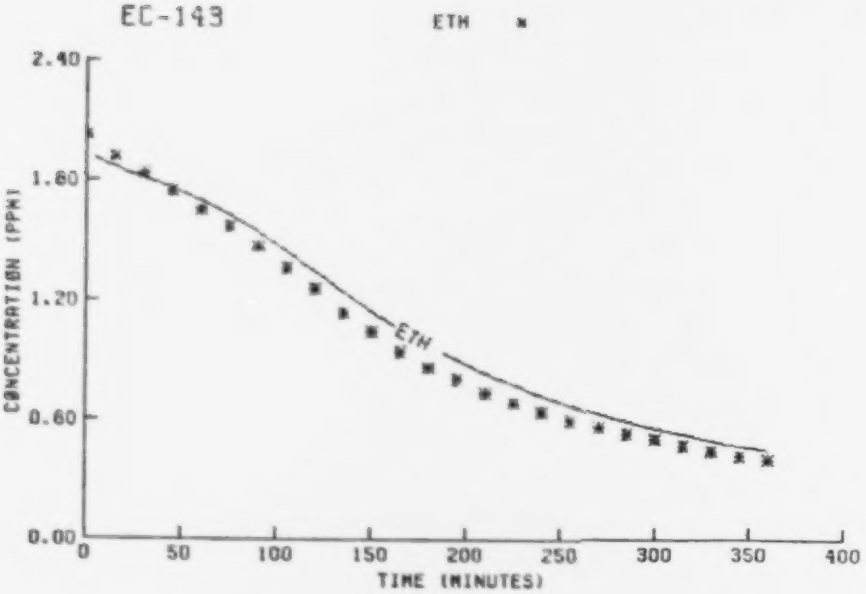
UCR ETHYLENE EXPERIMENTS


EC-142
ETH +
O3 *
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH
O3

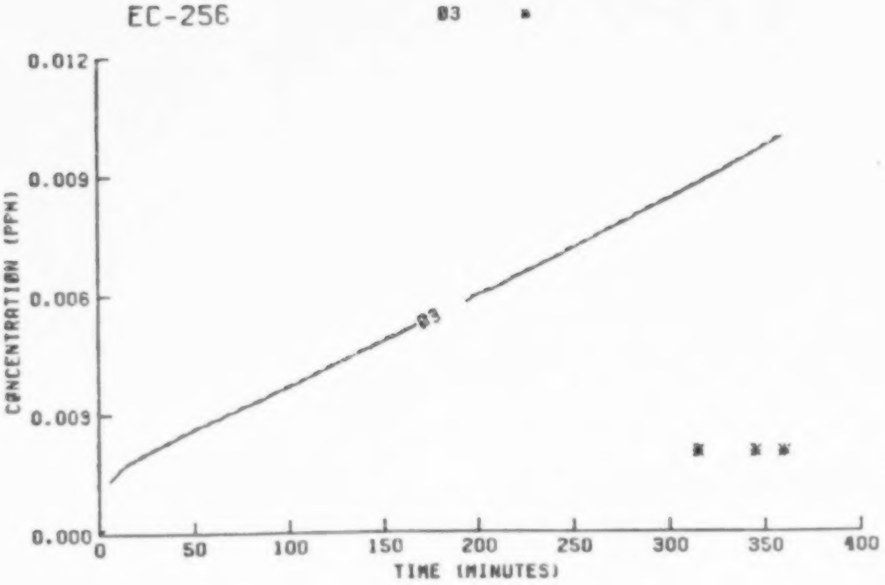

EC-142
NO2 +
NO *
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

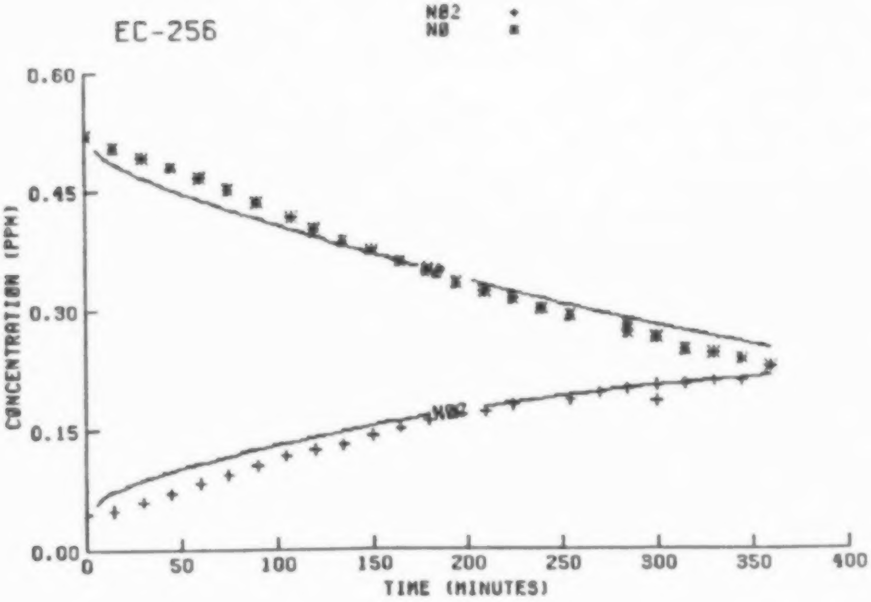

EC-143
O3 *
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

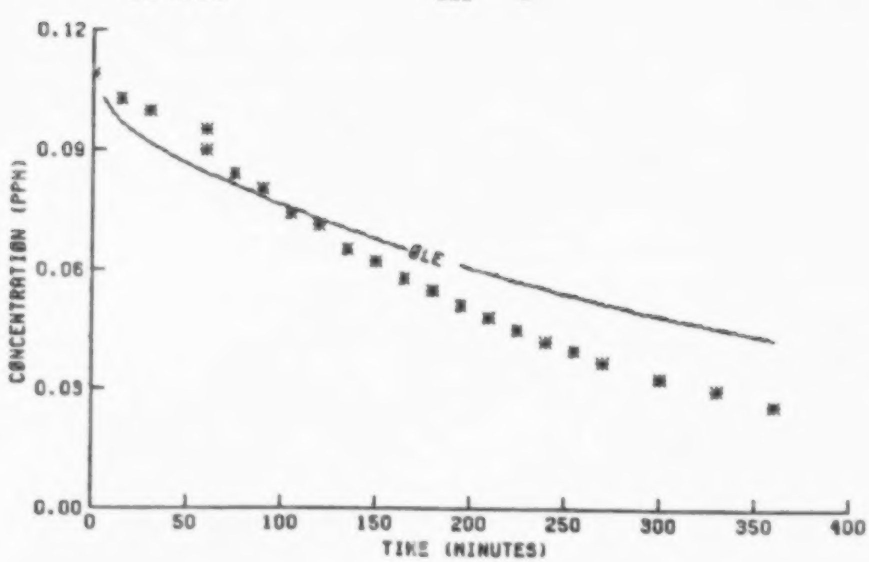

EC-143
NO2 +
NO *
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

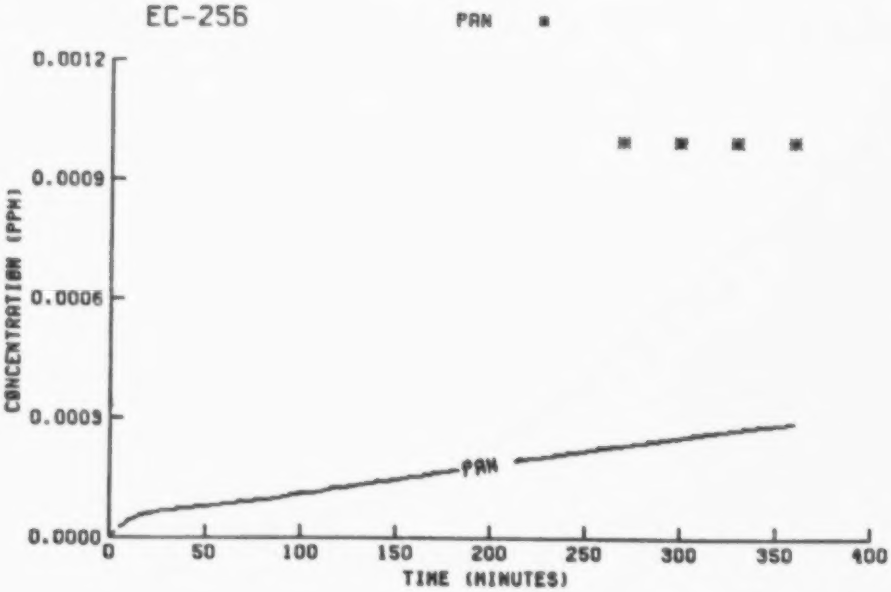

EC-143
ETH *
2.40
1.80
1.20
0.60
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

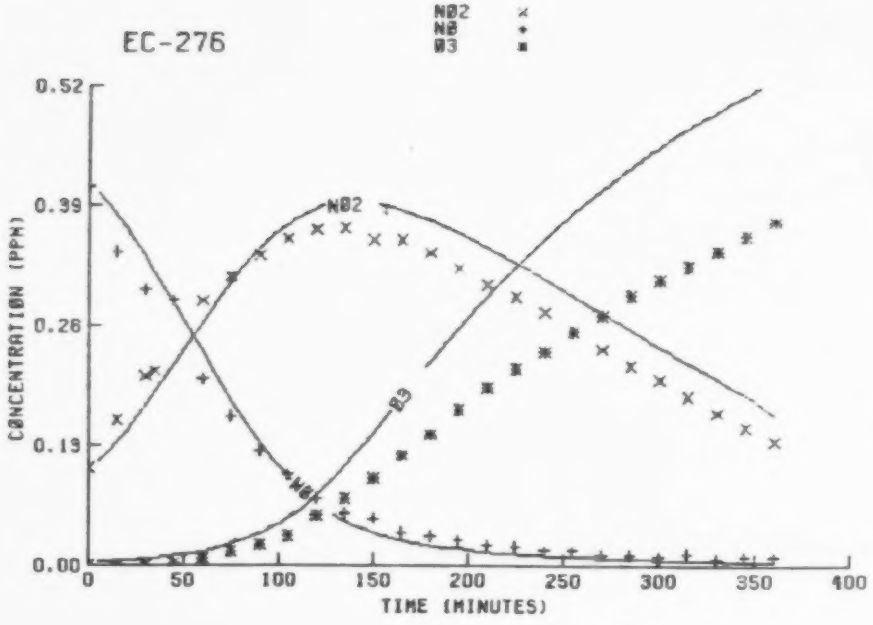
UCR PROPYLENE EXPERIMENTS

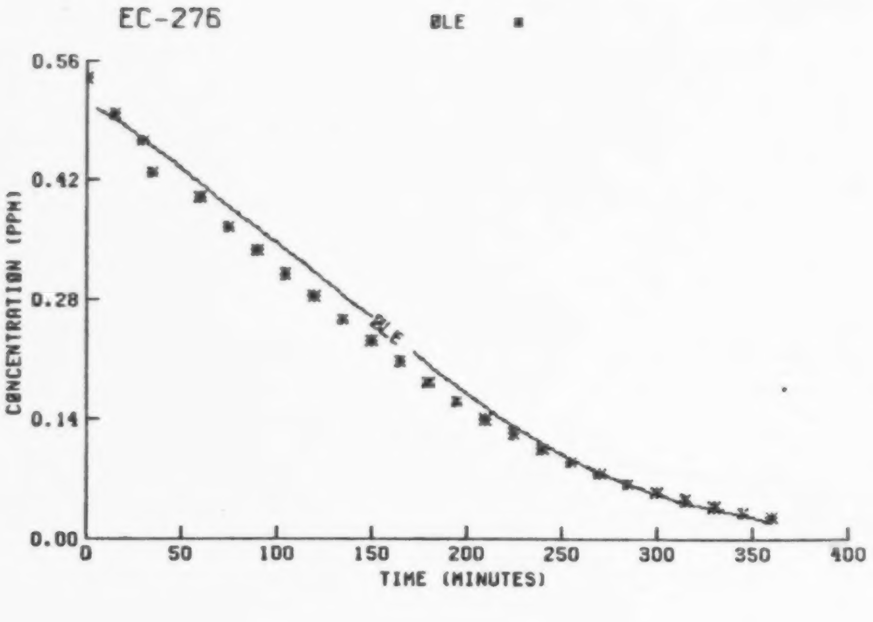

EC-256
O3 *
0.012
0.009
0.006
0.003
0.000
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

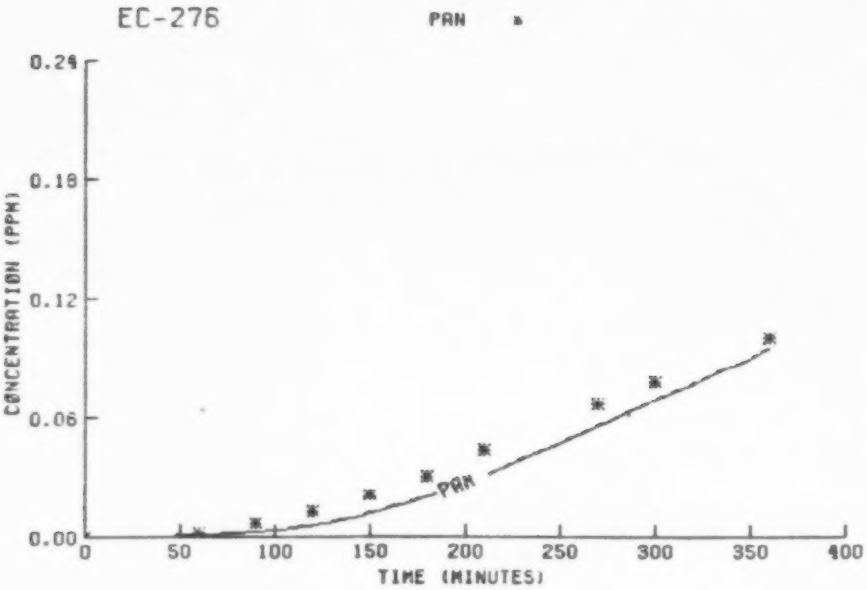

EC-256
NO2 +
NO *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
NO
NO2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

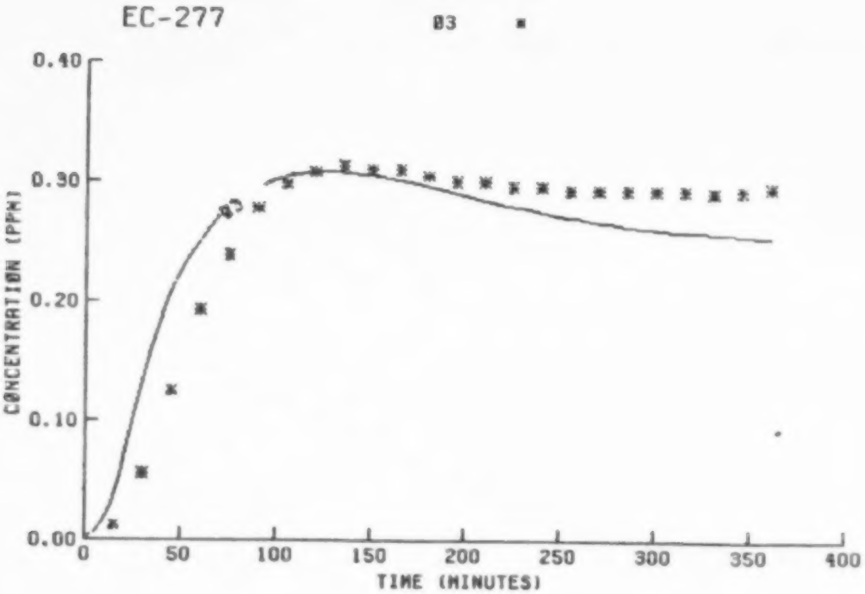

EC-256
OLE
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
OLE

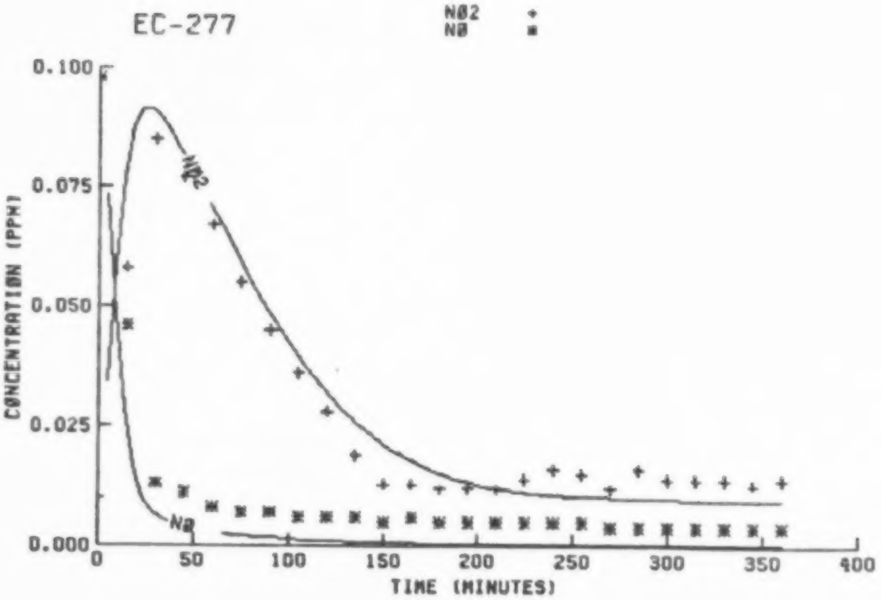

EC-256
PAN
0.0012
0.0009
0.0006
0.0003
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

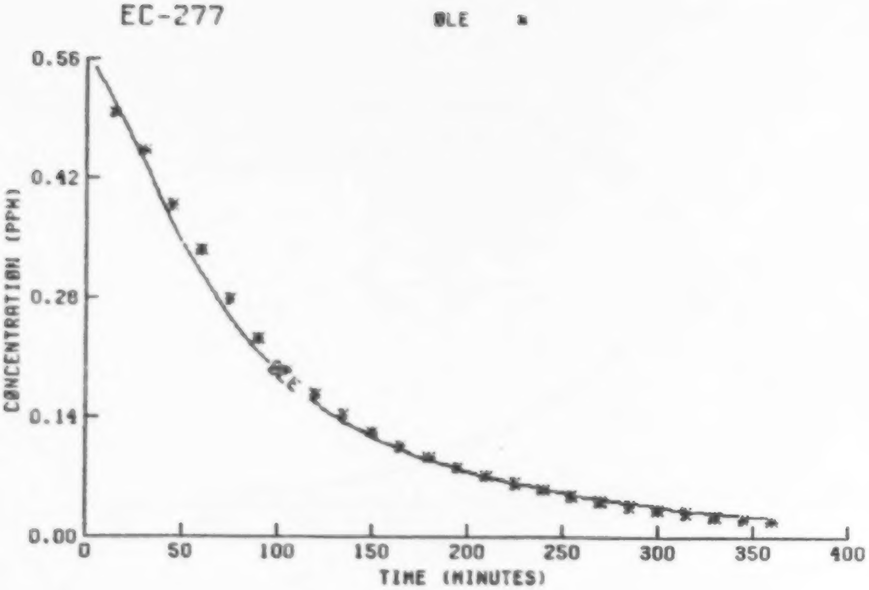

EC-276
NO2 ×
NO +
O3 *
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3

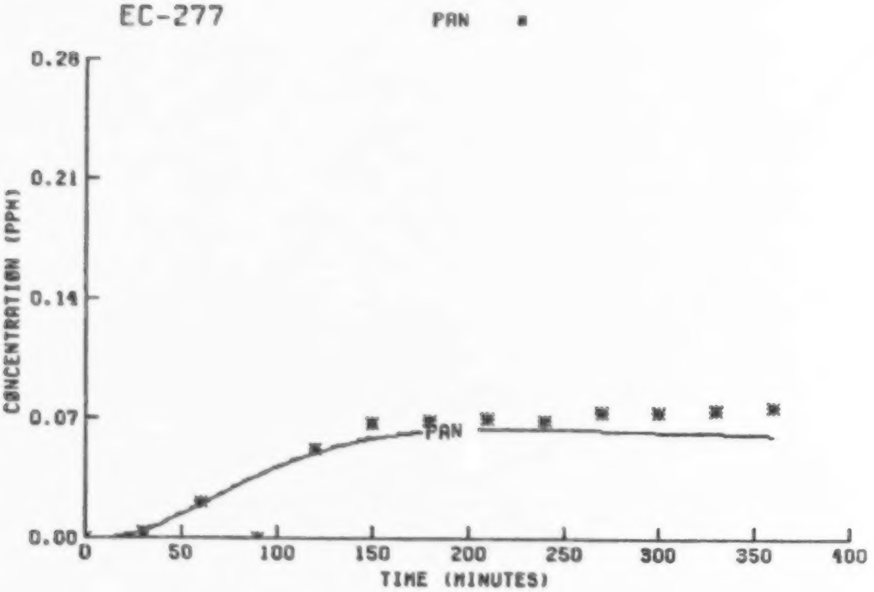

EC-276
OLE *
0.56
0.42
0.28
0.14
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
OLE

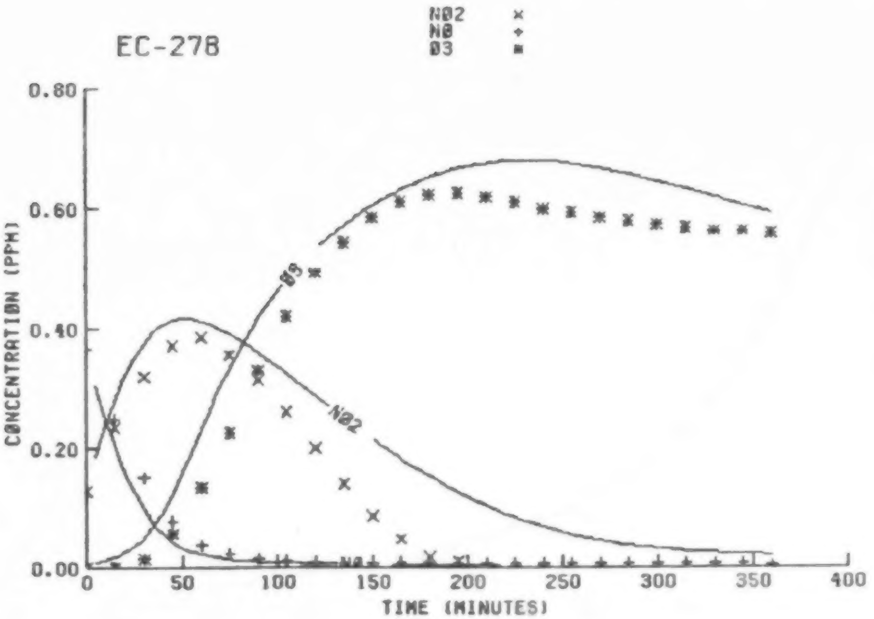

EC-276
PAN *
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

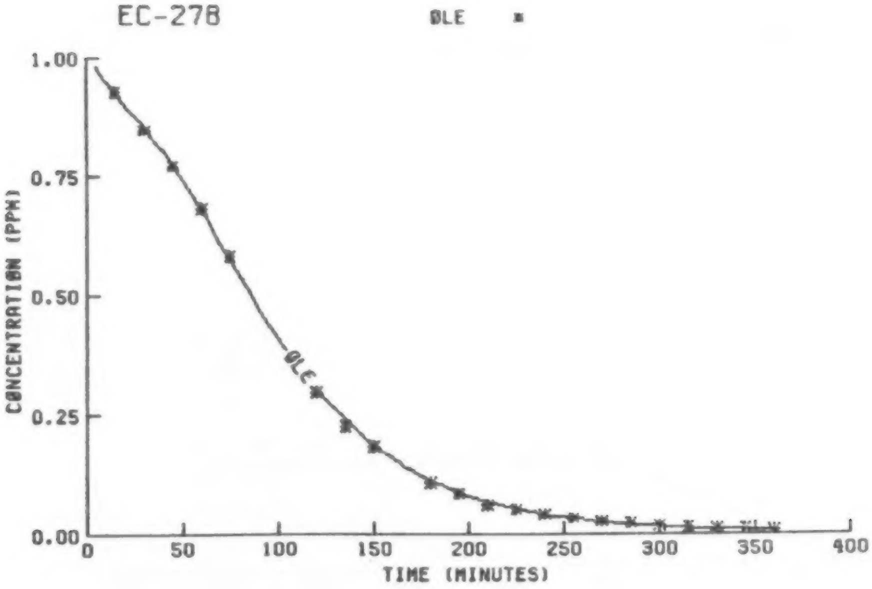

EC-277
O3 *
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3

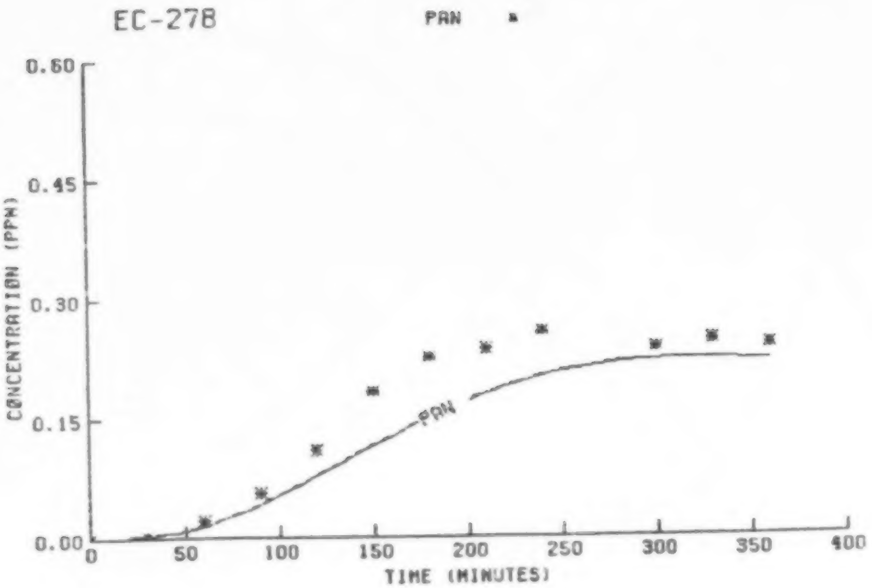

EC-277
NO2 +
NO *
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO

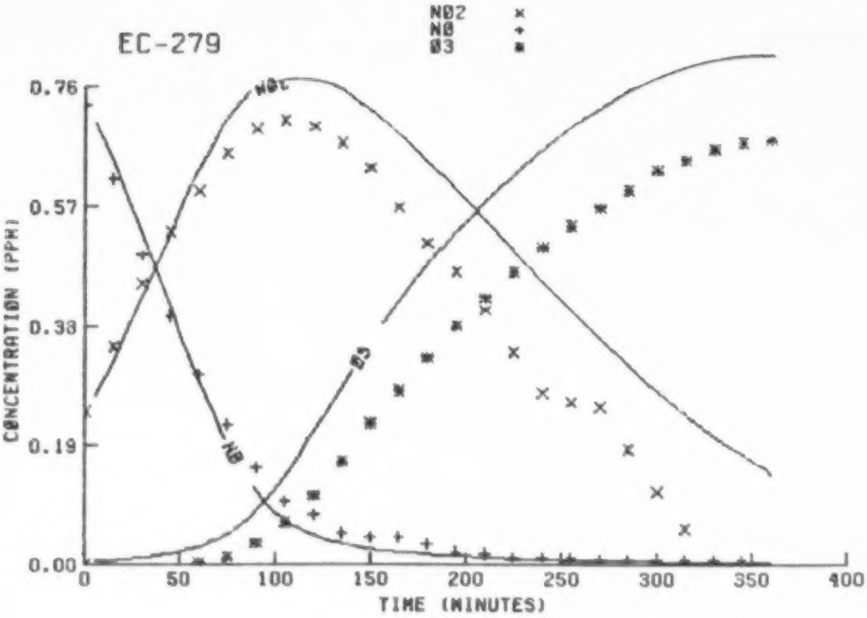

EC-277
OLE *
0.56
0.42
0.28
0.14
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
OLE

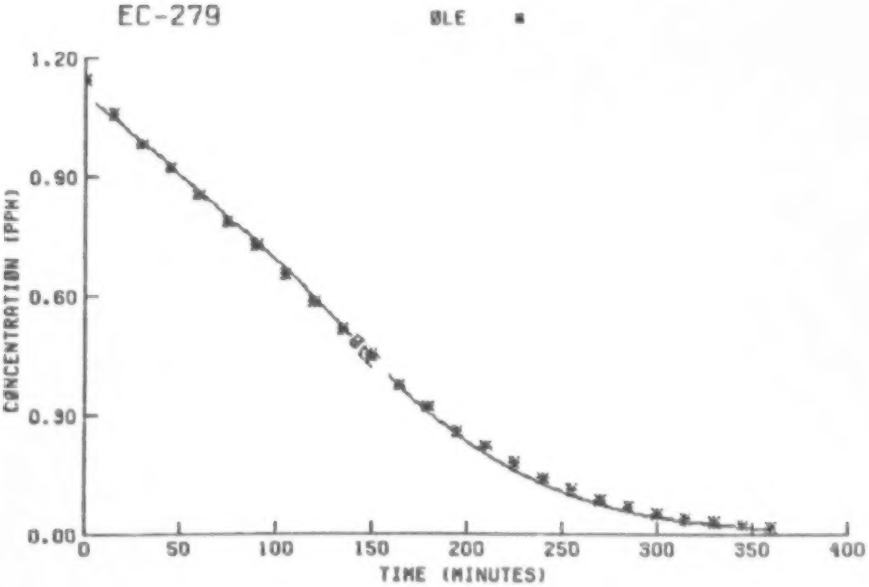

EC-277
PAN *
0.28
0.21
0.14
0.07
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

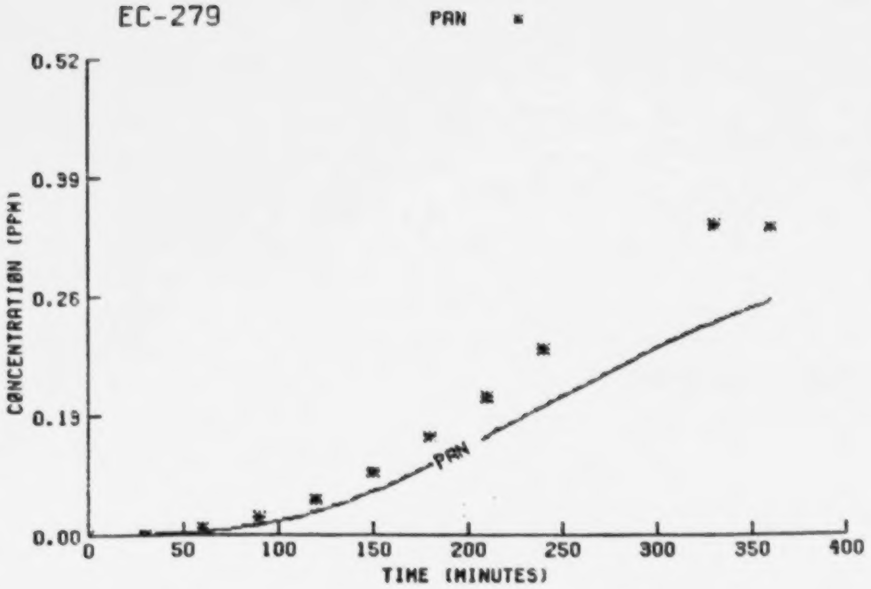

EC-278
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.00
0.20
0.40
0.60
0.80
O3
NO2
NO
TIME (MINUTES)
0
50
100
150
200
250
300
350
400


EC-278
OLE ✱
CONCENTRATION (PPM)
0.00
0.25
0.50
0.75
1.00
OLE
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

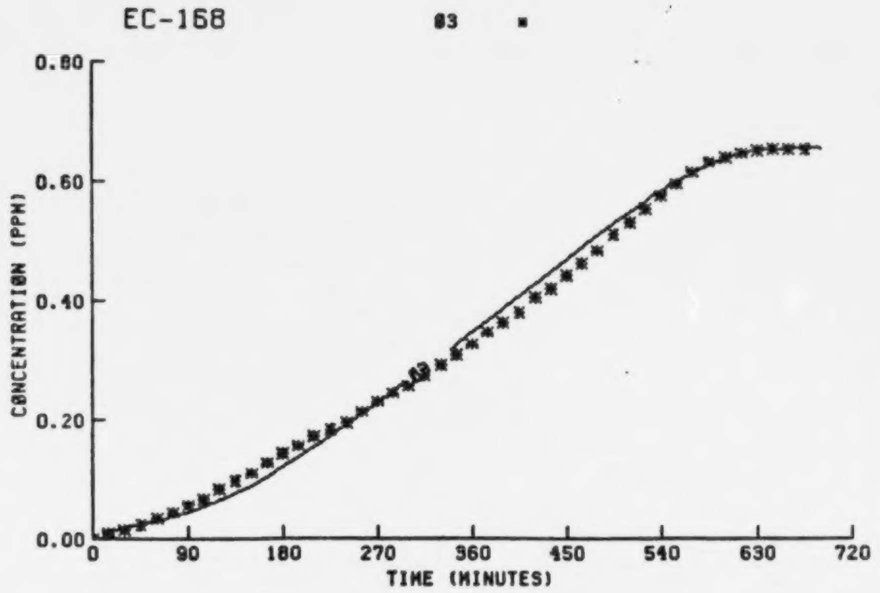

EC-278
PAN *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

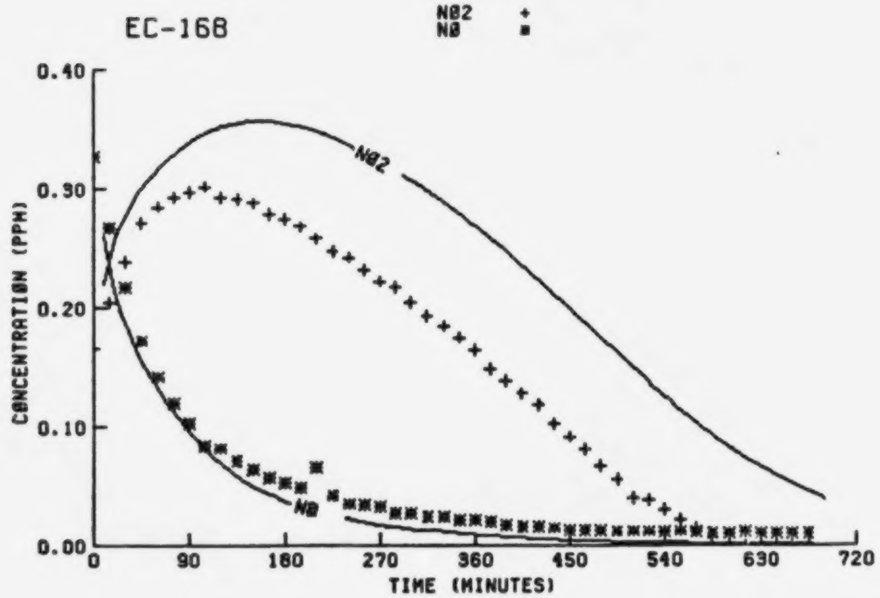

EC-279
NØ2 ×
NØ +
Ø3 ✱
NØ2
NØ
Ø3
0.76
0.57
0.38
0.19
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

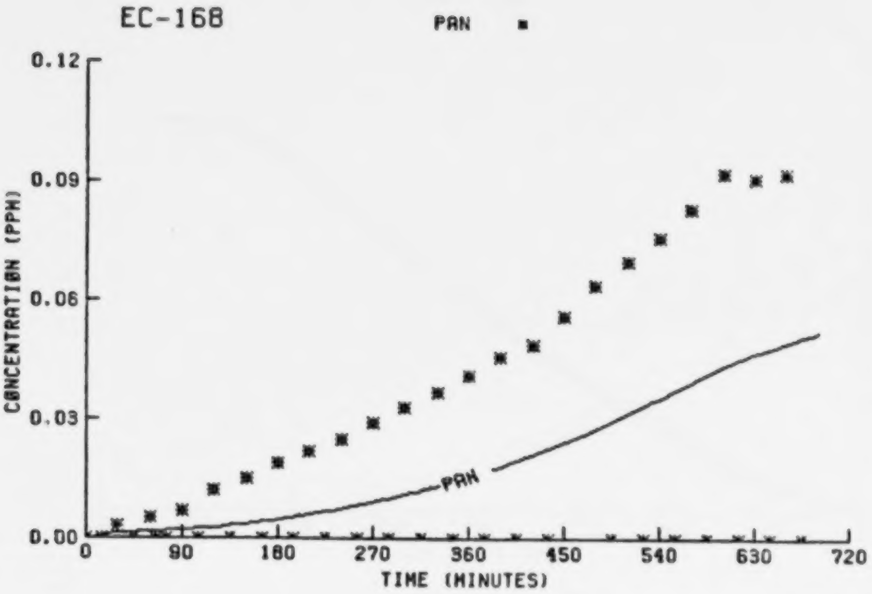

EC-279
ØLE ✱
ØLE
1.20
0.90
0.60
0.30
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

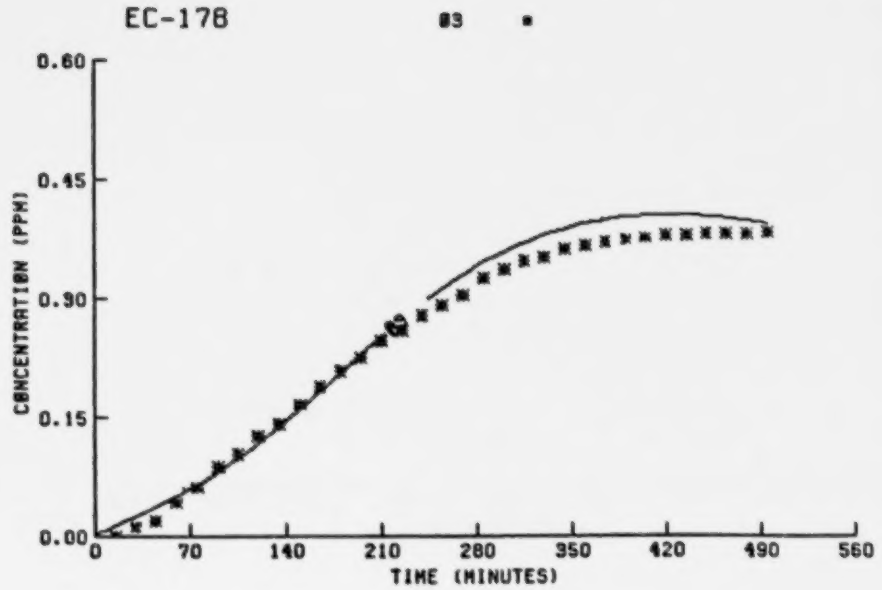

EC-279
PAN *
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

UCR BUTANE EXPERIMENTS


EC-168
O3 *
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
O3

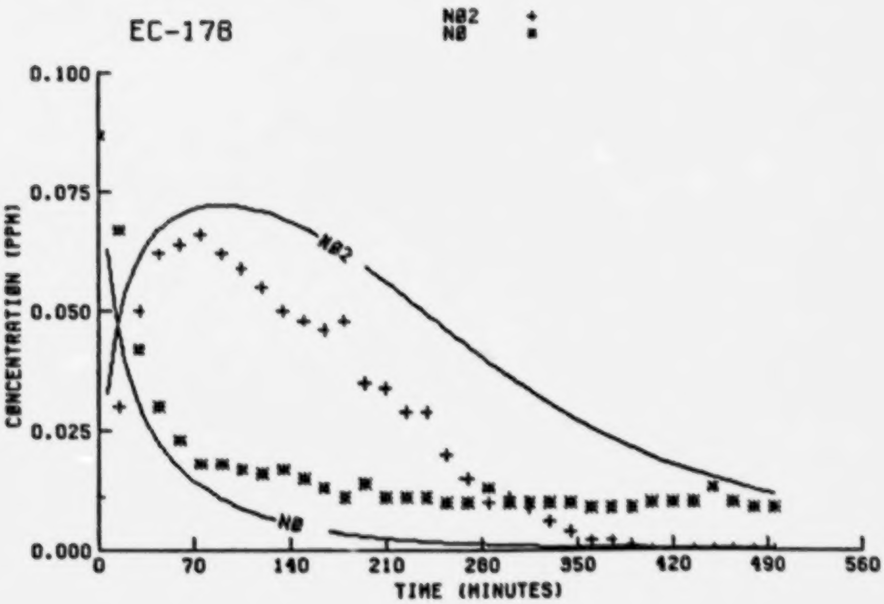

EC-168
NO2 +
NO *
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
NO2
NO


EC-168
PAN
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
PAN
0
90
180
270
360
450
540
630
720
TIME (MINUTES)



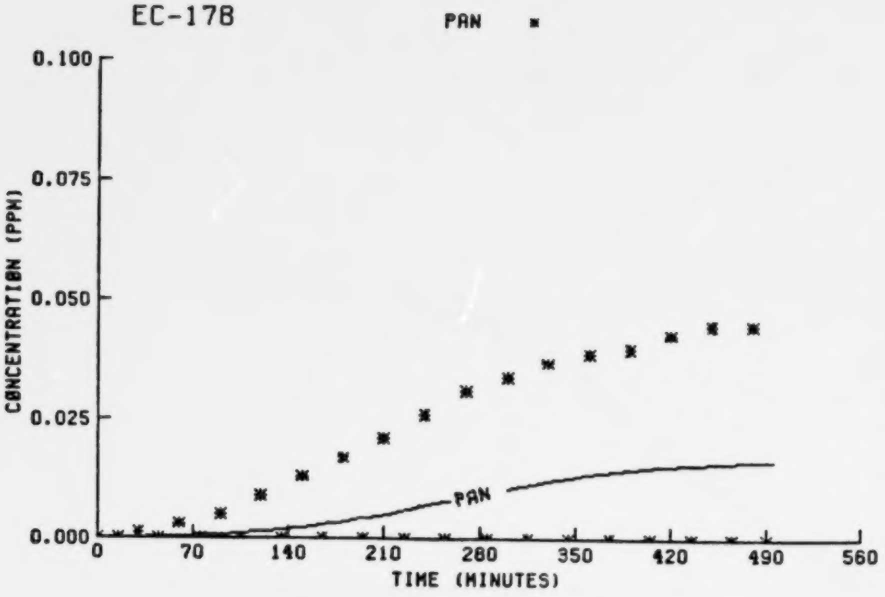
EC-178

O3 *
CONCENTRATION (PPM)
0.60
0.45
0.30
0.15
0.00
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

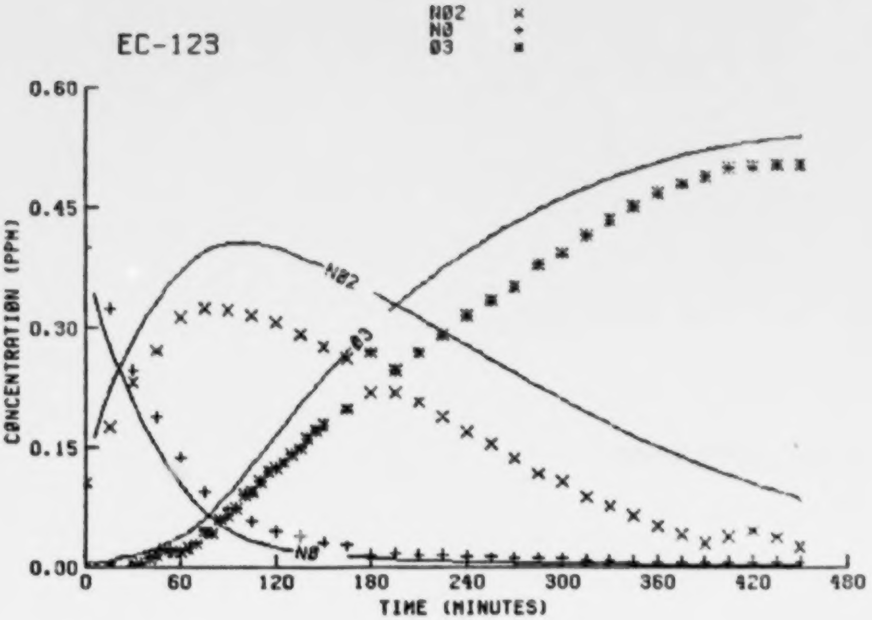


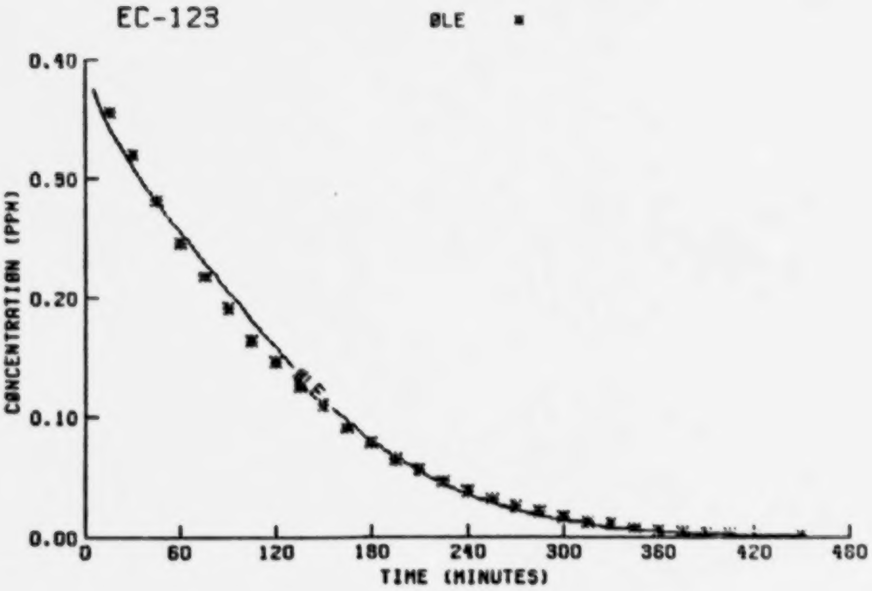
EC-178

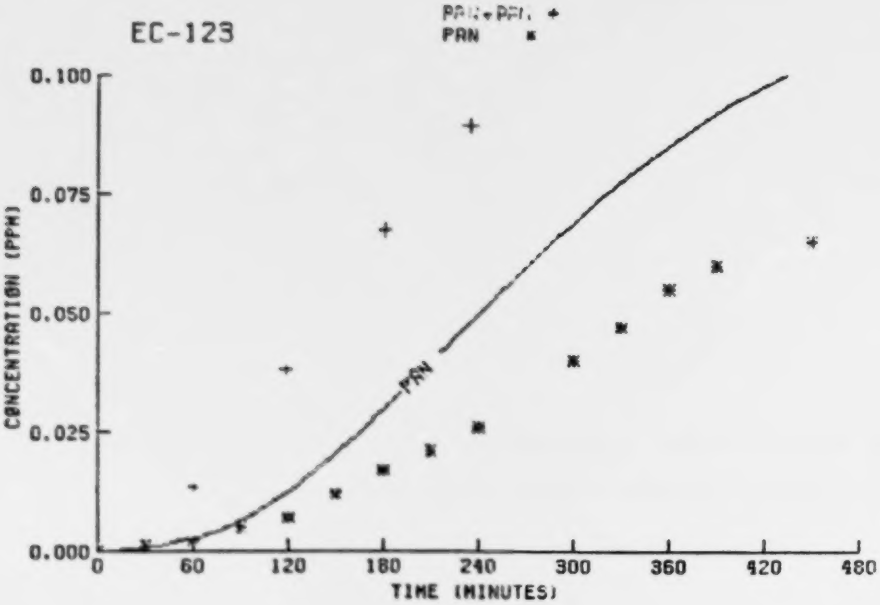
NO2 +
NO *
CONCENTRATION (PPM)
0.100
0.075
0.050
0.025
0.000
NO2
NO
0
70
140
210
280
350
420
490
560
TIME (MINUTES)


EC-178
PAN *
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
PAN

UCR 1-BUTENE EXPERIMENTS

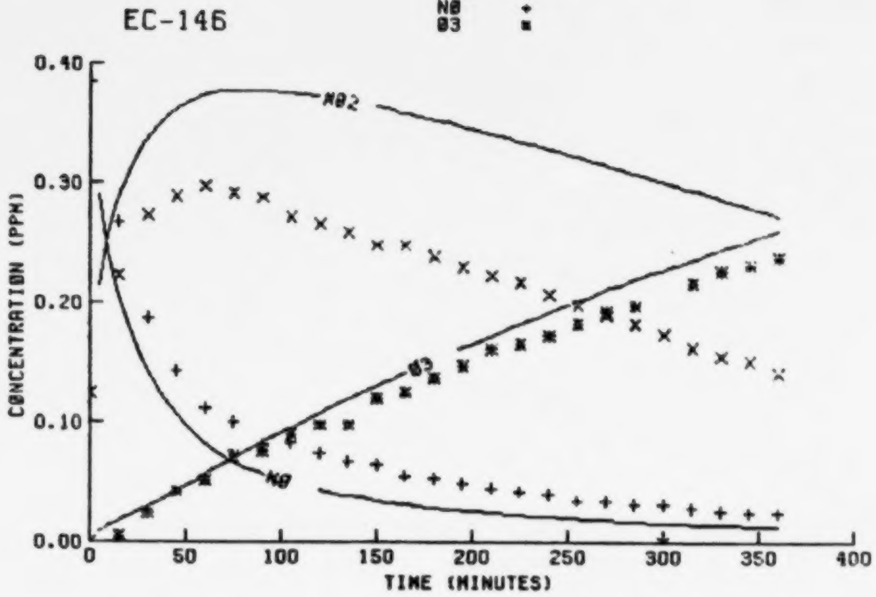

EC-123
NØ2 ×
NØ +
Ø3 ✱
CØNCENTRATIØN (PPM)
0.60
0.45
0.30
0.15
0.00
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
NØ2
Ø3
NØ

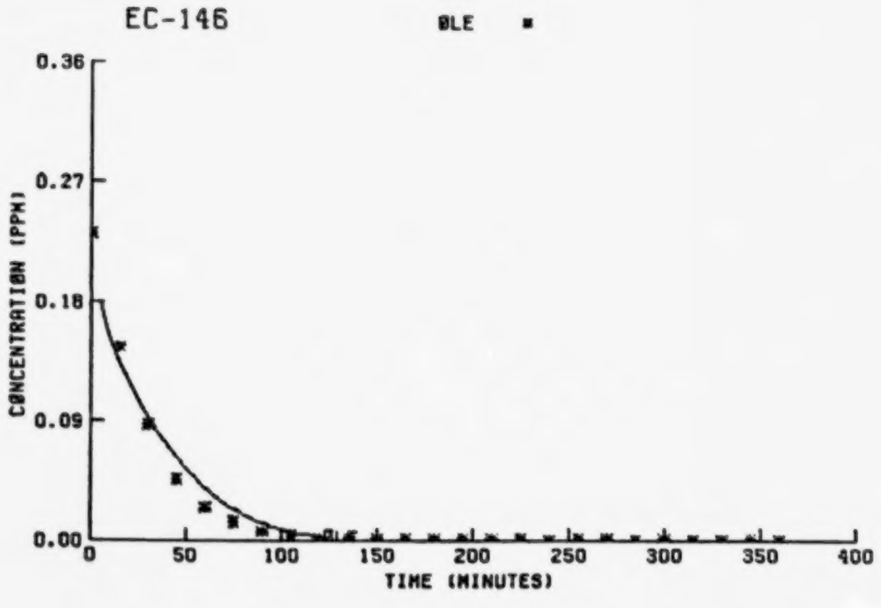

EC-123
ØLE ✱
CØNCENTRATIØN (PPM)
0.40
0.30
0.20
0.10
0.00
0
60
120
180
240
300
360
420
480
TIME (MINUTES)
ØLE

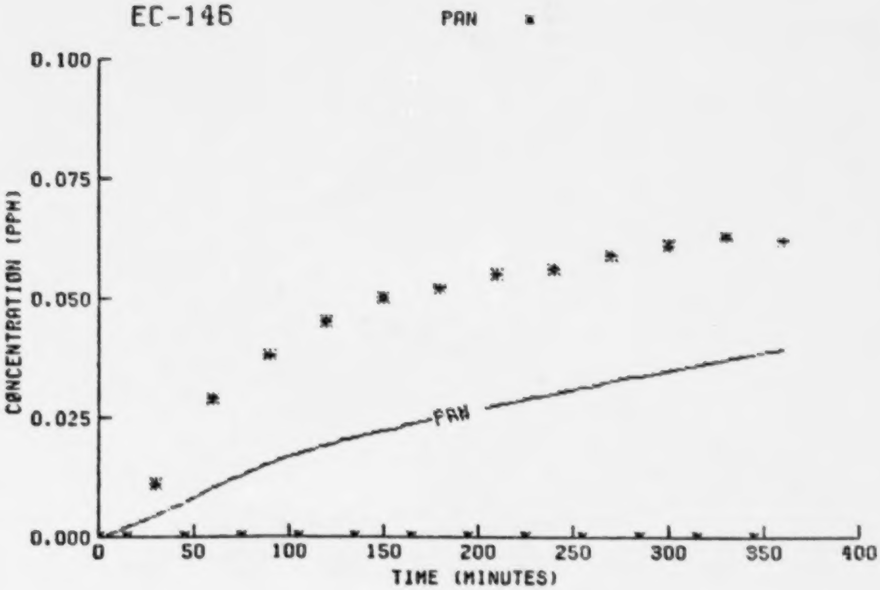


EC-123
PAN+PPN +
PAN *
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
PAN
0
60
120
180
240
300
360
420
480
TIME (MINUTES)

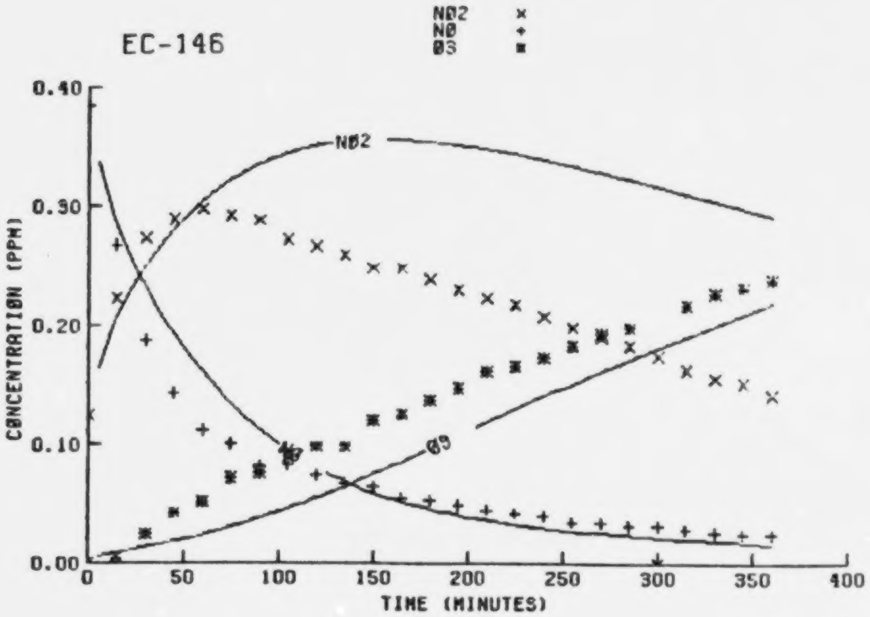
UCR TRANS-2-BUTENE EXPERIMENTS
(With trans-2-butene treated as an olefin)

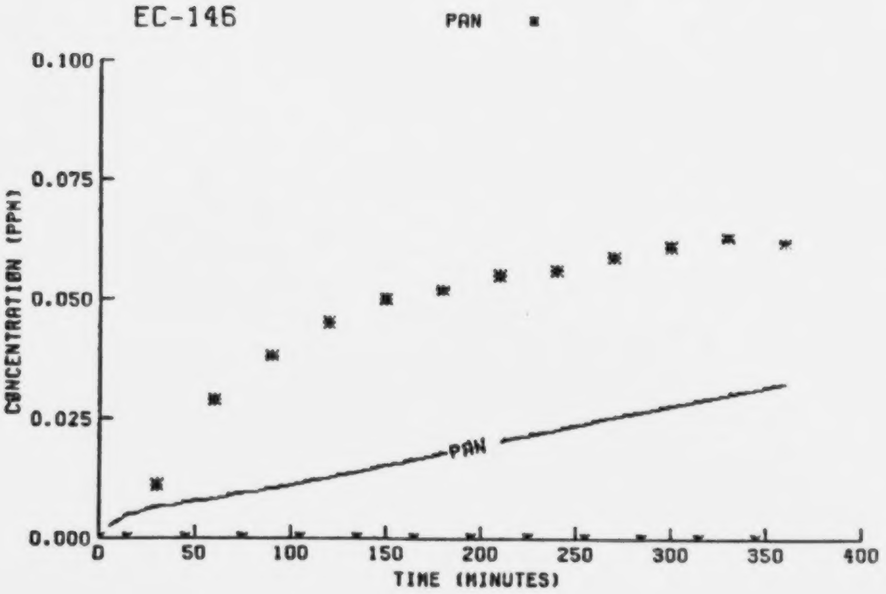

EC-146
NO2 ×
NO +
O3 ⁎
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
NO2
O3
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-146
OLE ⁎
0.36
0.27
0.18
0.09
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

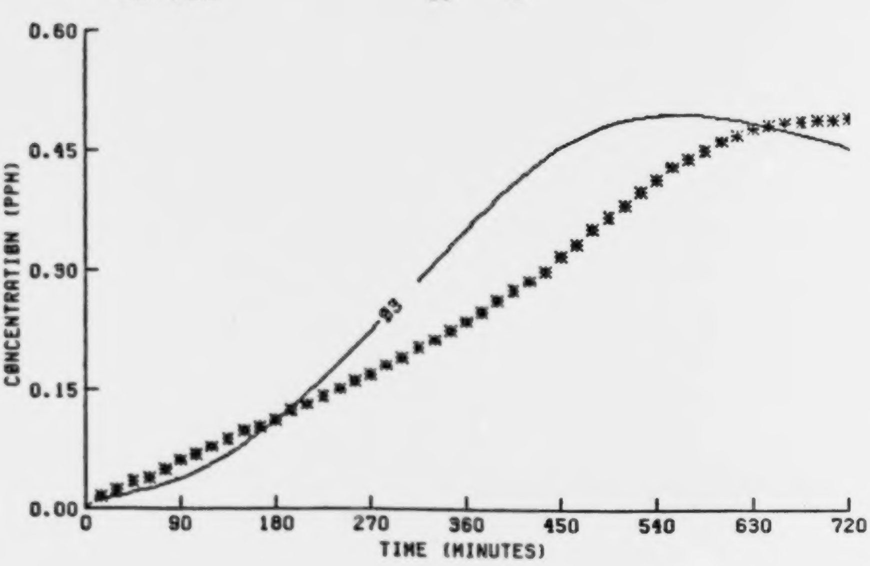

EC-146
PAN *
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

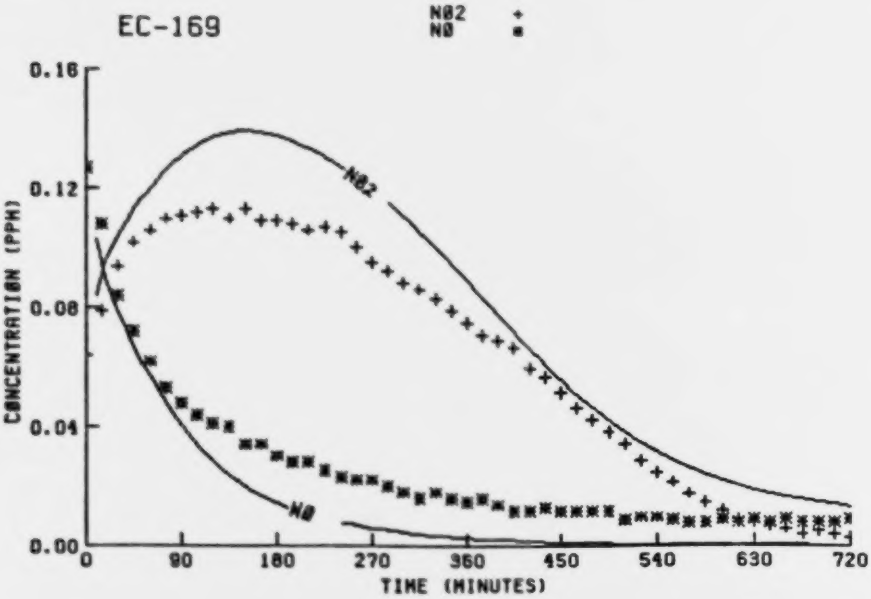
UCR TRANS-2-BUTENE EXPERIMENTS
(with trans-2-butene treated as a carbonyl)

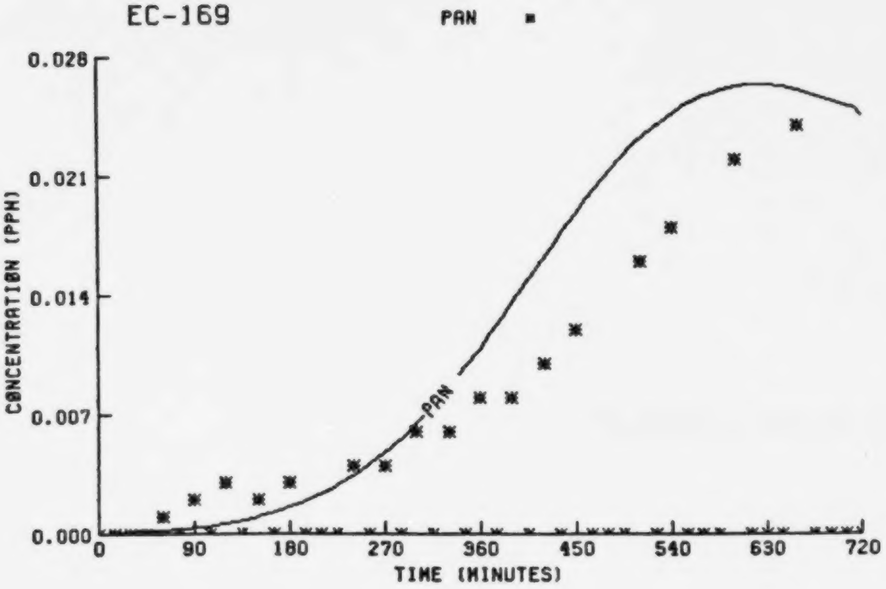

EC-146
NO2 ×
NO +
O3 ✱
NO2
O3
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-146
PAN ✱
PAN
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

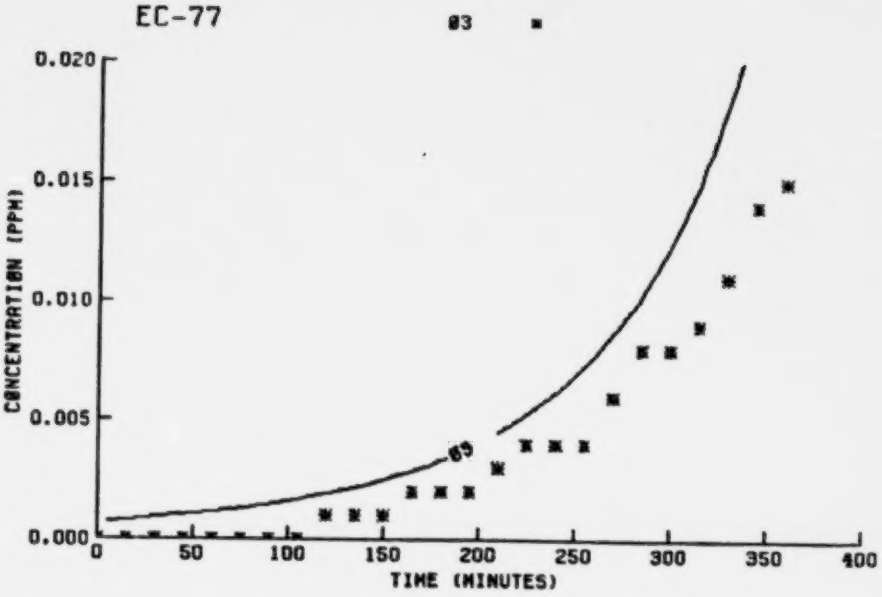
UCR 2,3-DIMETHYLBUTANE EXPERIMENTS

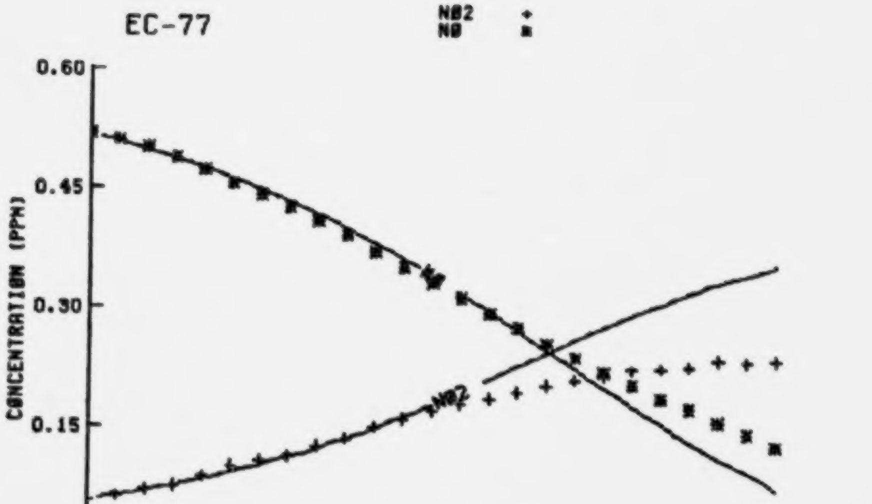

EC-169
O3 *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
O3
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

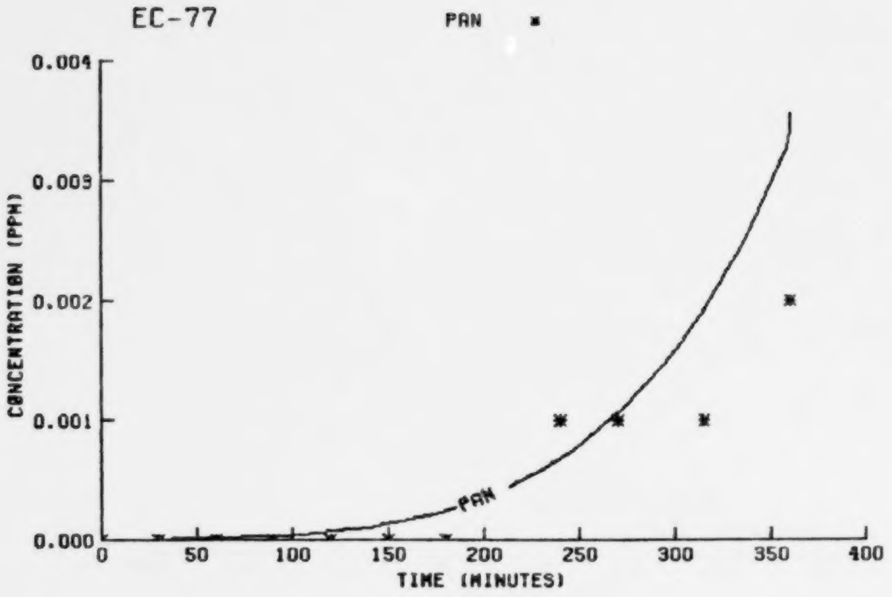

EC-169
NO2 +
NO *
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
NO2
NO
0
90
180
270
360
450
540
630
720
TIME (MINUTES)

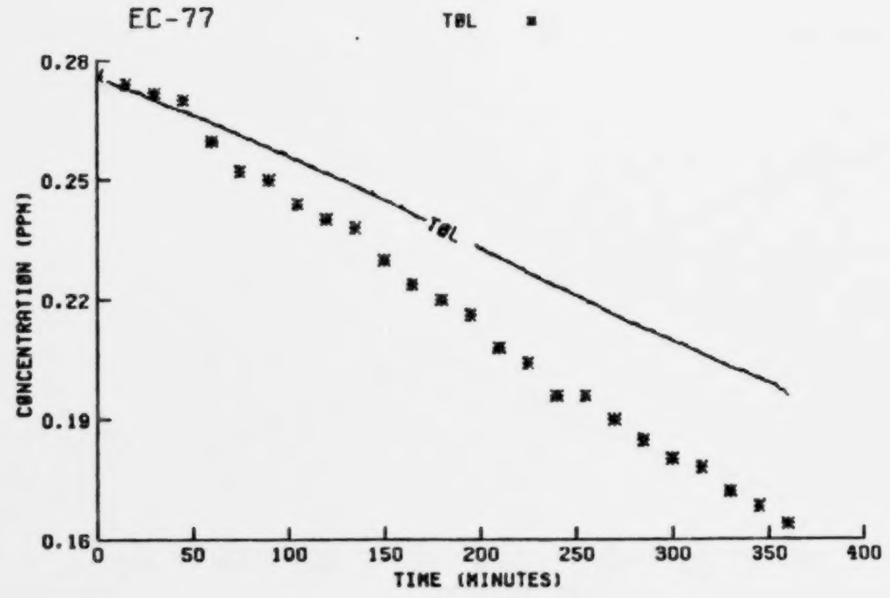

EC-169
PAN *
0.028
0.021
0.014
0.007
0.000
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
PAN

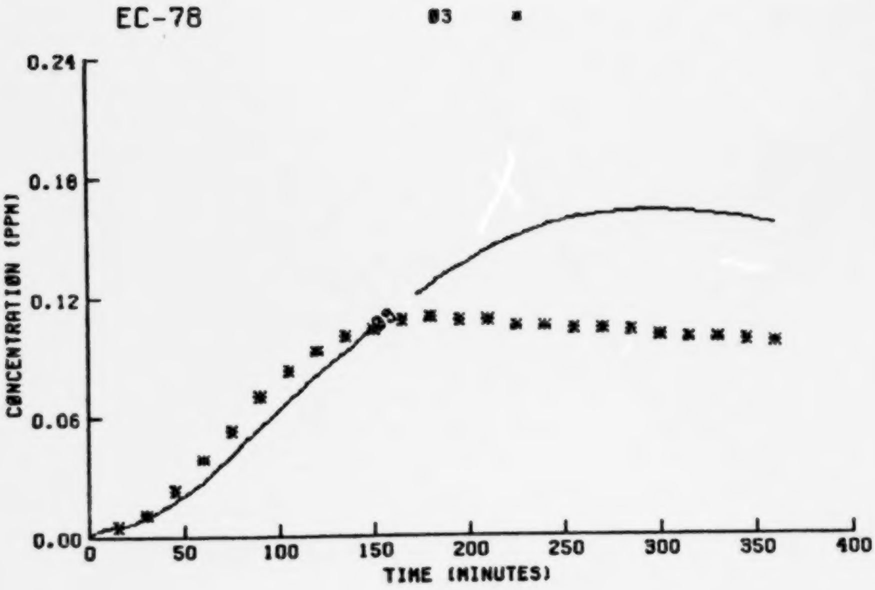
UCR TOLUENE EXPERIMENTS

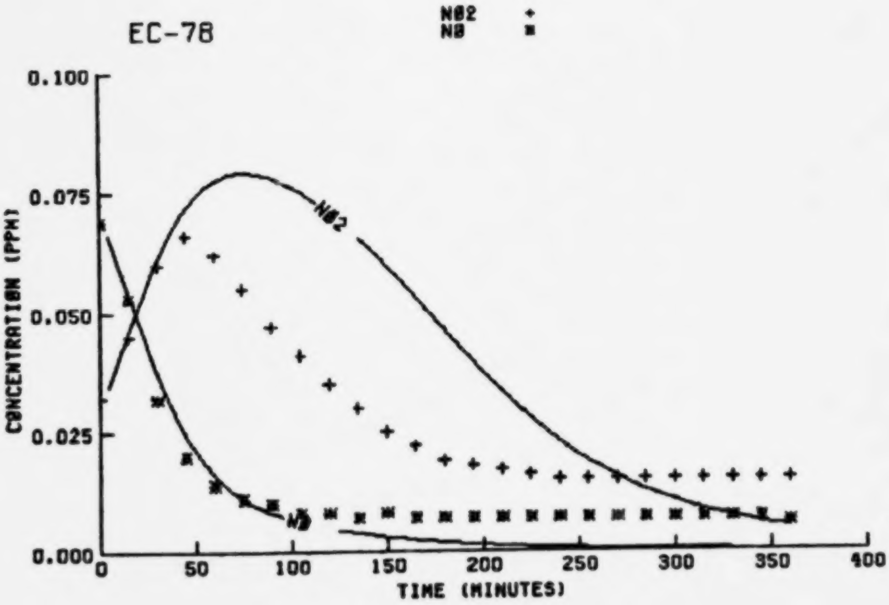

EC-77
O3 *
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

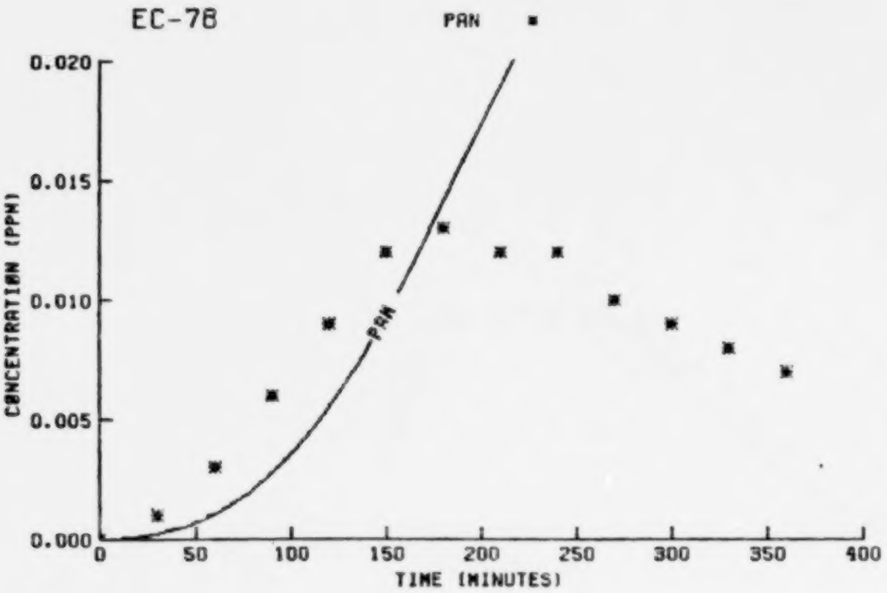

EC-77
NO2 +
NO *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
NO
NO2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

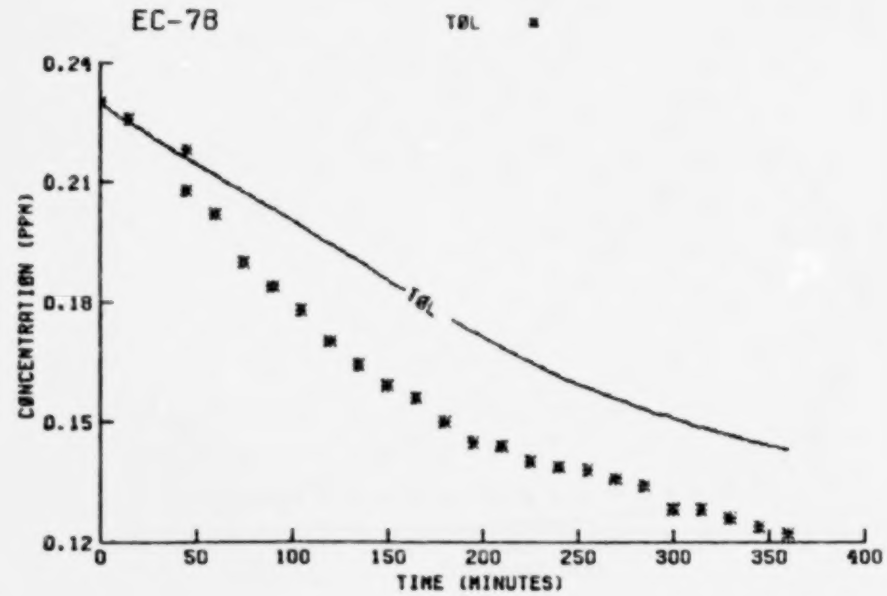

EC-77
PAN
CONCENTRATION (PPM)
0.004
0.003
0.002
0.001
0.000
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
PAN

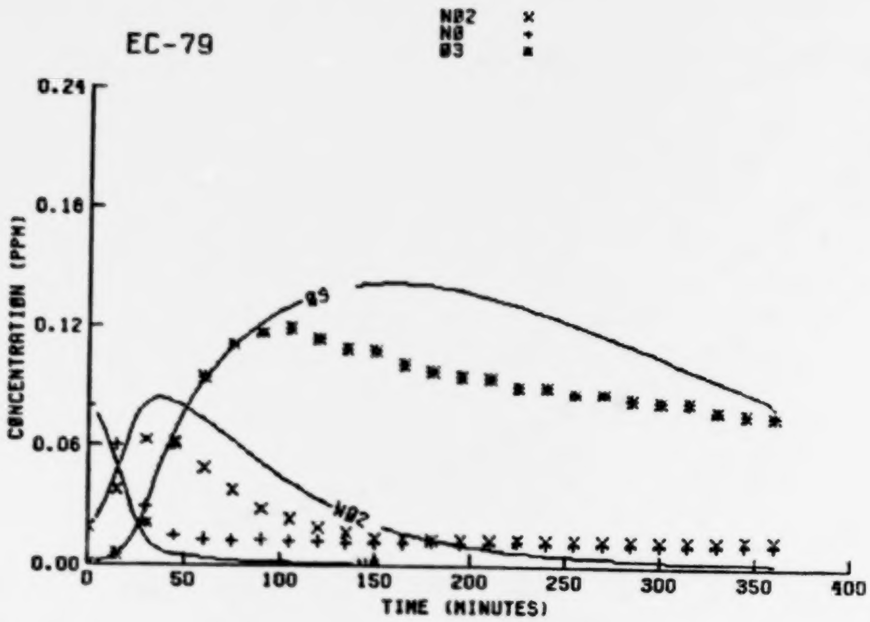

EC-77
TOL
CONCENTRATION (PPM)
0.28
0.25
0.22
0.19
0.16
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
TOL

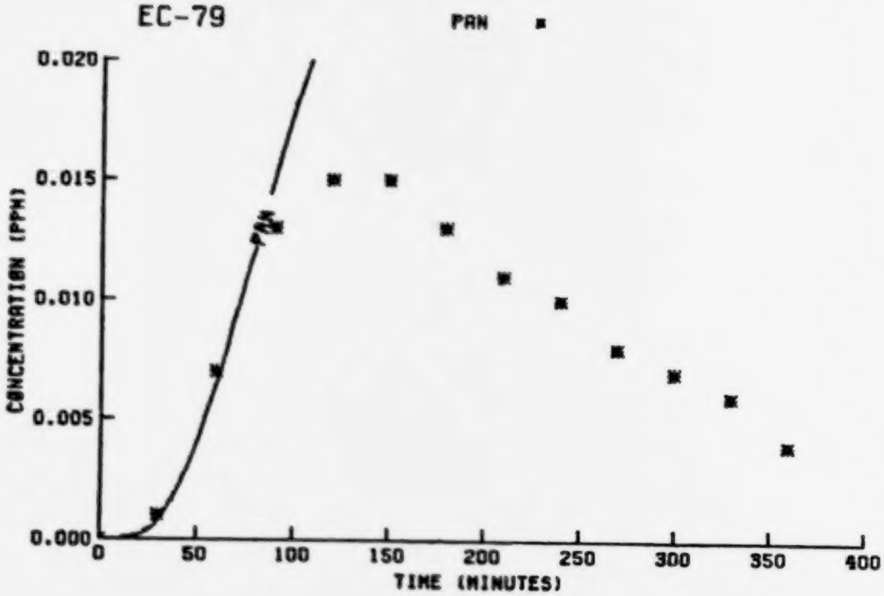

EC-78
O3 *
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

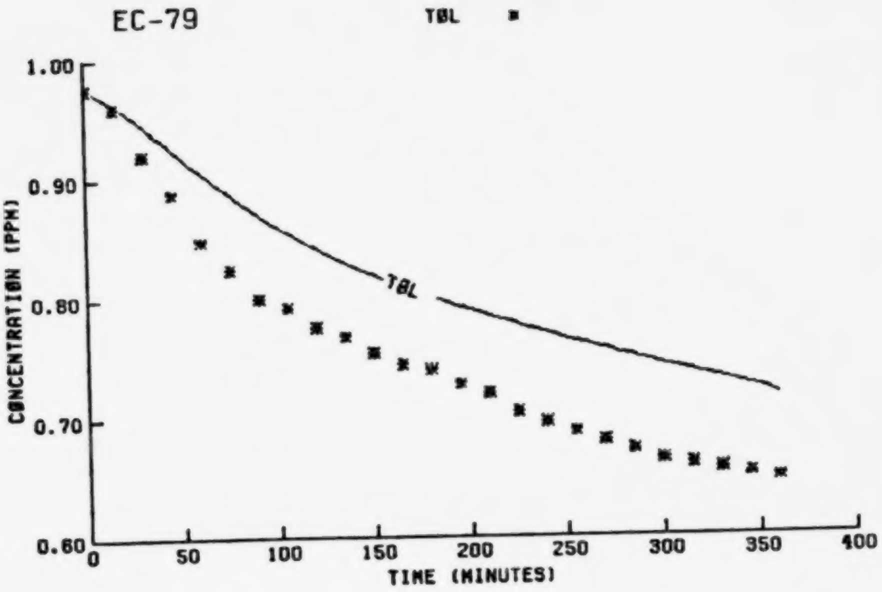

EC-78
NO2 +
NO *
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

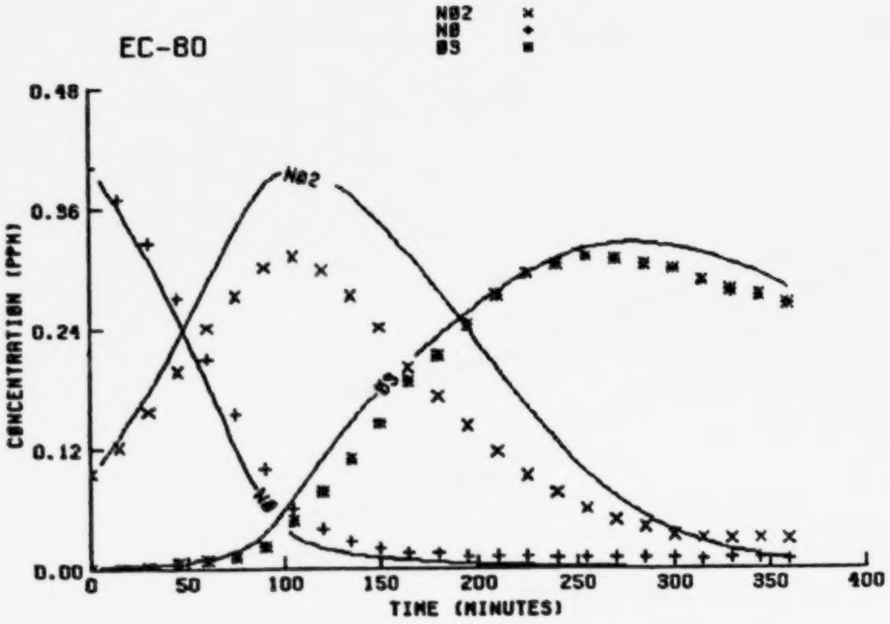

EC-78
PAN ✱
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

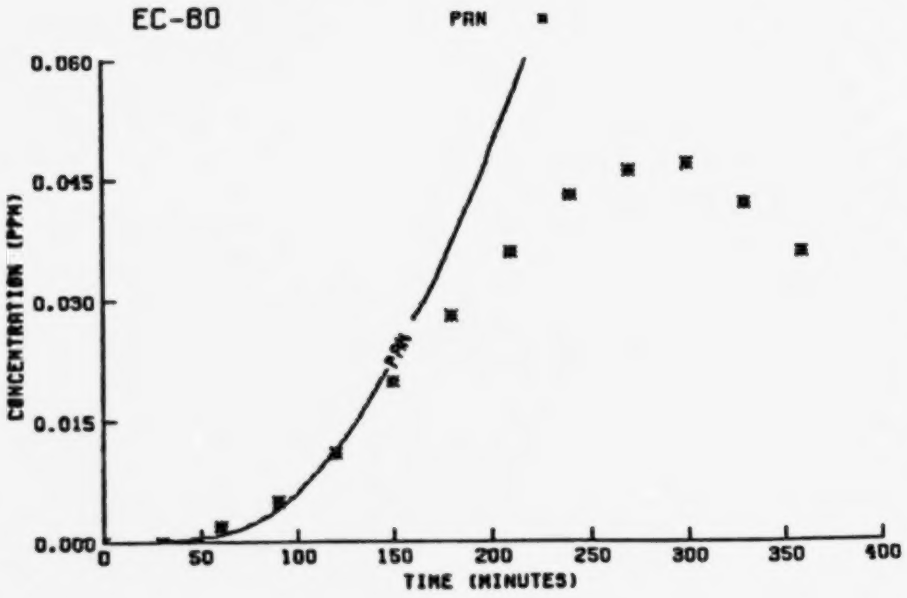

EC-78
TOL ✱
0.24
0.21
0.18
0.15
0.12
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
TOL

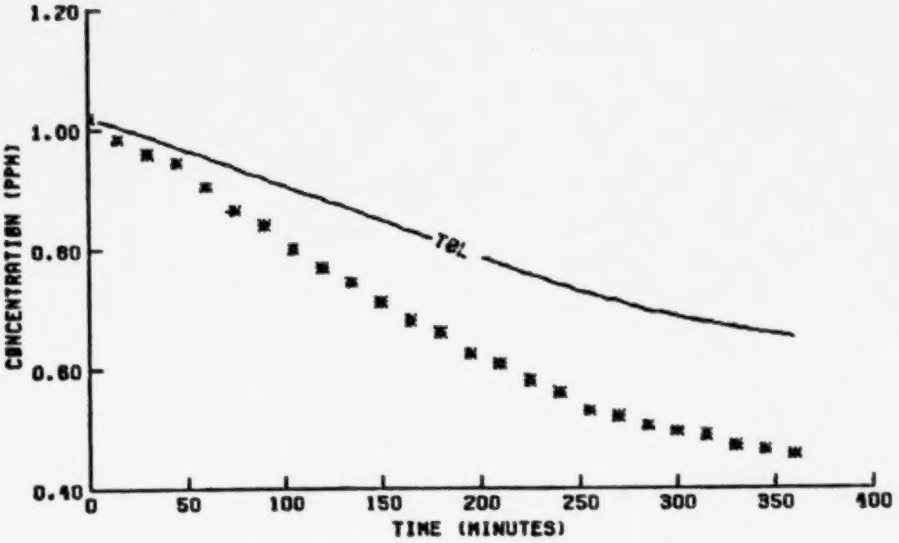

EC-79
NO2 ×
NO +
O3 *
0.24
0.18
0.12
0.06
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3
NO2

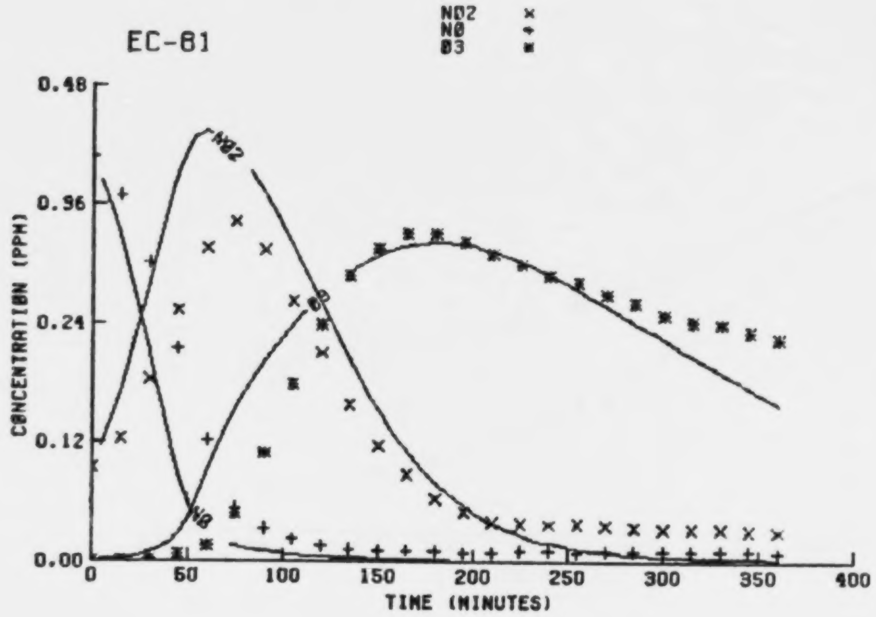

EC-79
PAN *
0.020
0.015
0.010
0.005
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

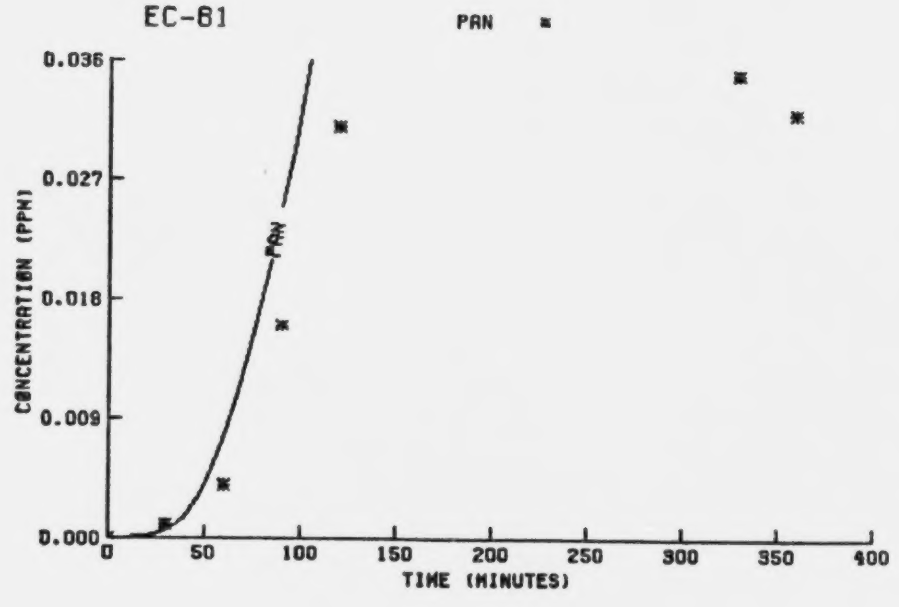

EC-79
TOL *
1.00
0.90
0.80
0.70
0.60
CONCENTRATION (PPM)
TOL
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

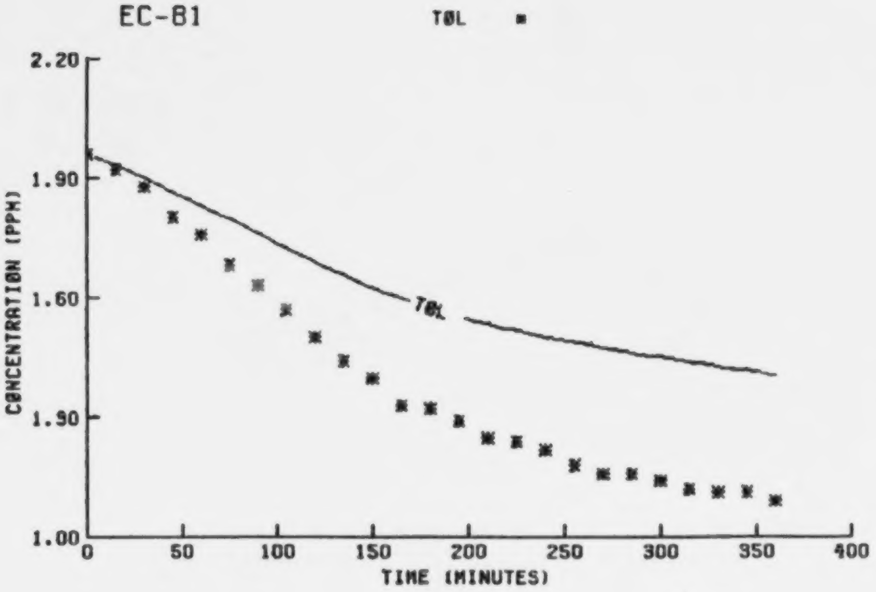

EC-80
NO2 ×
NO +
O3 ✱
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPM)
NO2
NO
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

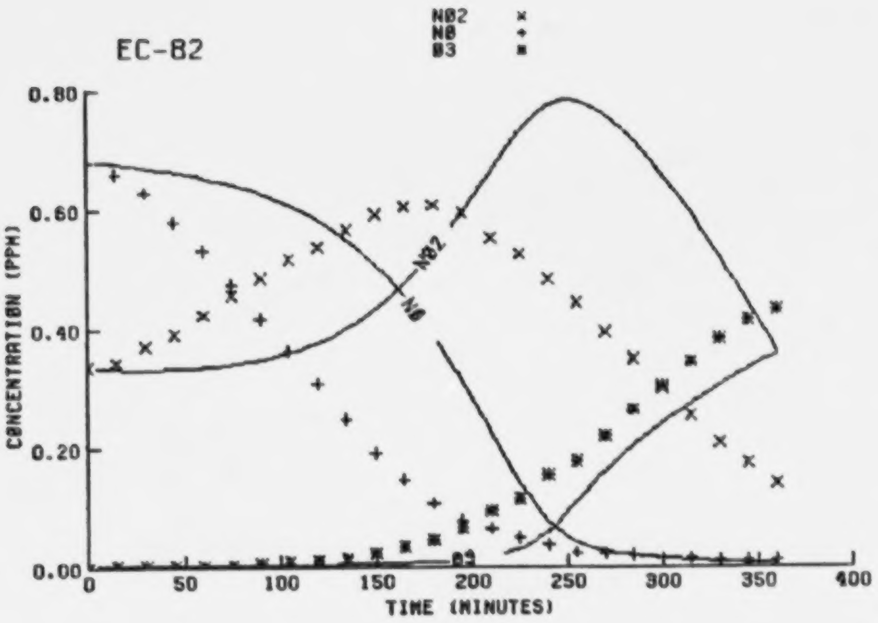

EC-80
PAN ✱
0.060
0.045
0.030
0.015
0.000
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

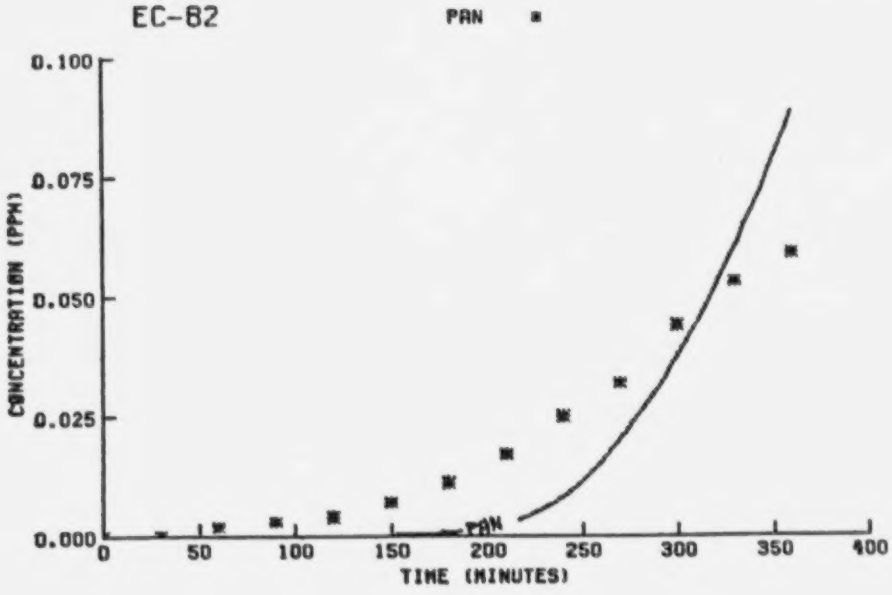

EC-80
TBL ✱
1.20
1.00
0.80
0.60
0.40
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
TBL

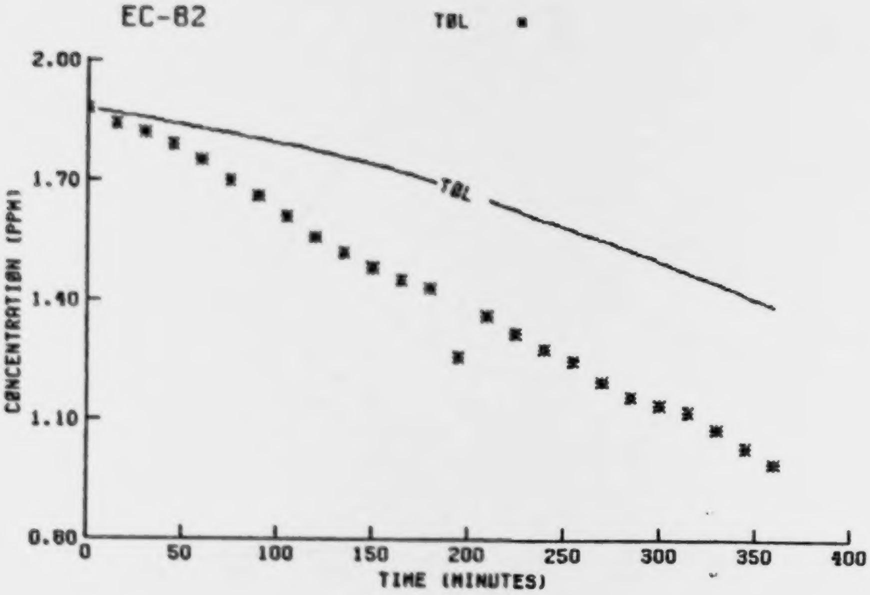

EC-81
NO2 ×
NO +
O3 *
NO2
NO
O3
CONCENTRATION (PPM)
0.48
0.36
0.24
0.12
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

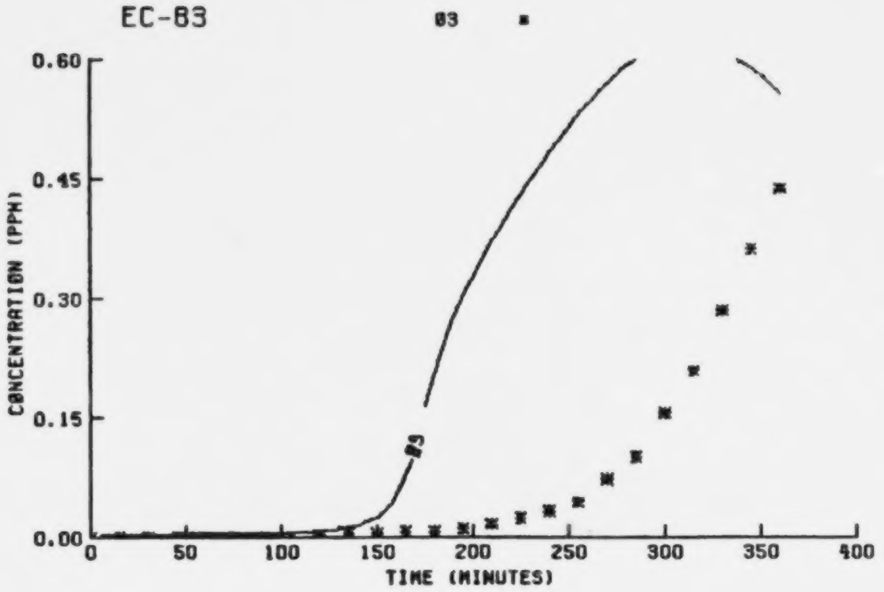

EC-81
PAN *
PAN
CONCENTRATION (PPM)
0.036
0.027
0.018
0.009
0.000
TIME (MINUTES)
0
50
100
150
200
250
300
350
400

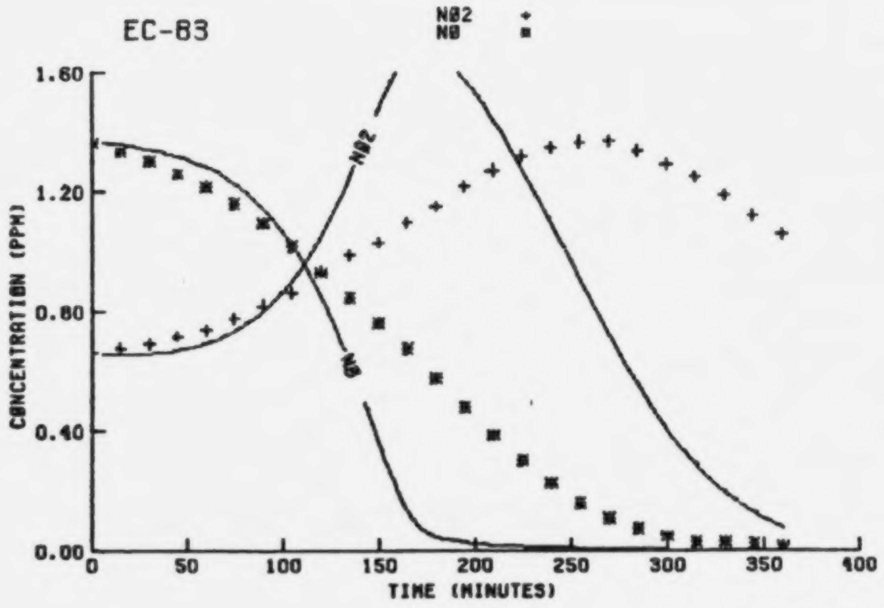

EC-81
TOL *
2.20
1.90
1.60
1.30
1.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
TOL

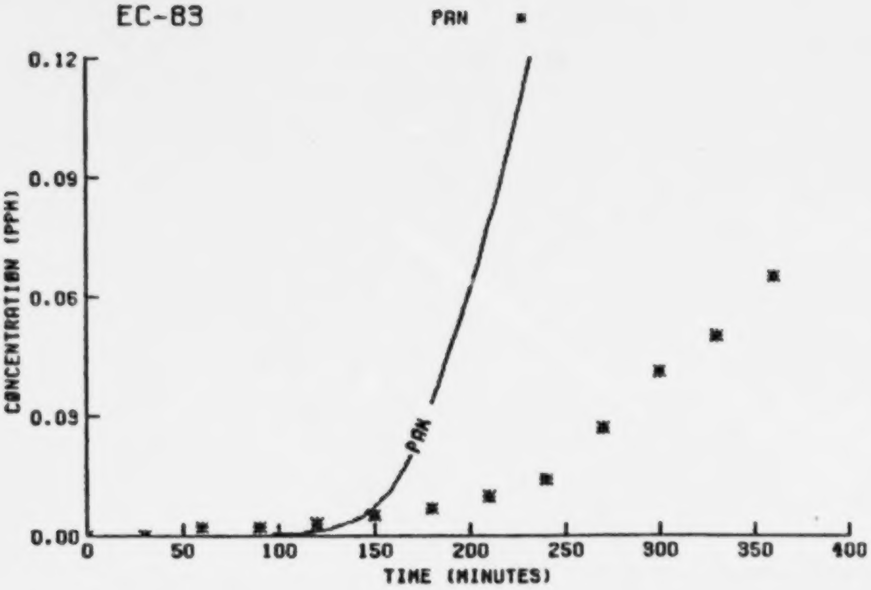

EC-82
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3


EC-82
PAN ✱
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

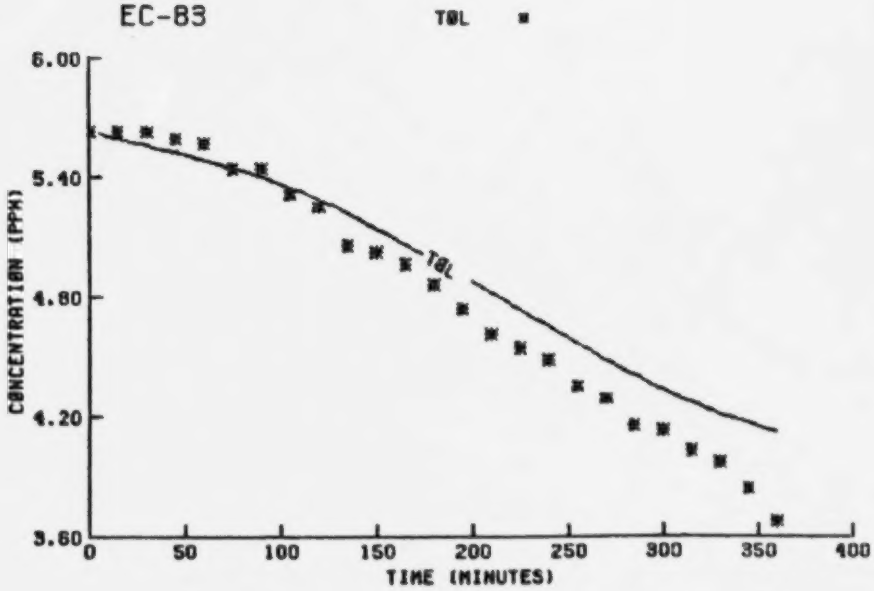

EC-82
TØL *
2.00
1.70
1.40
1.10
0.80
CØNCENTRATIØN (PPM)
TØL
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-83
O3 *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

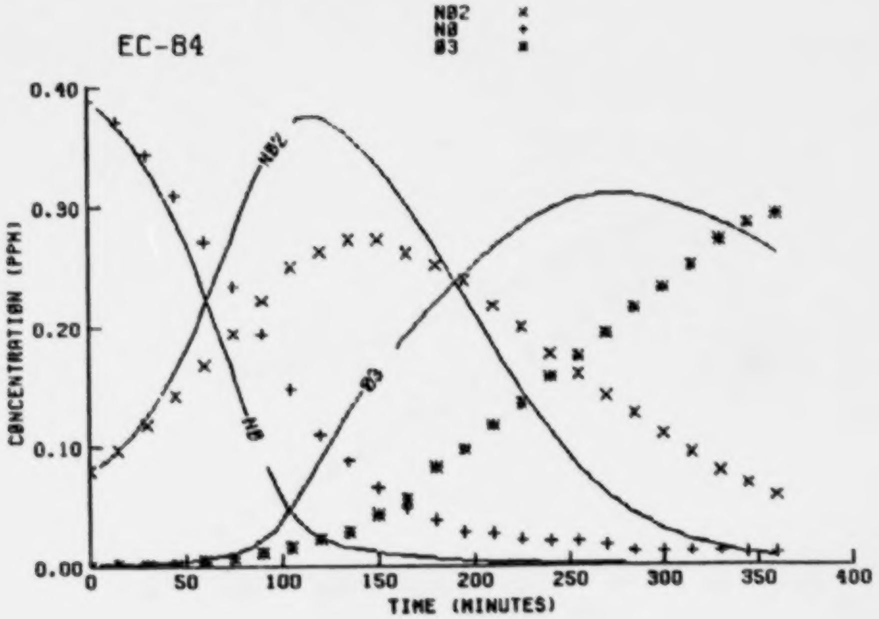

EC-83
NO2 +
NO *
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

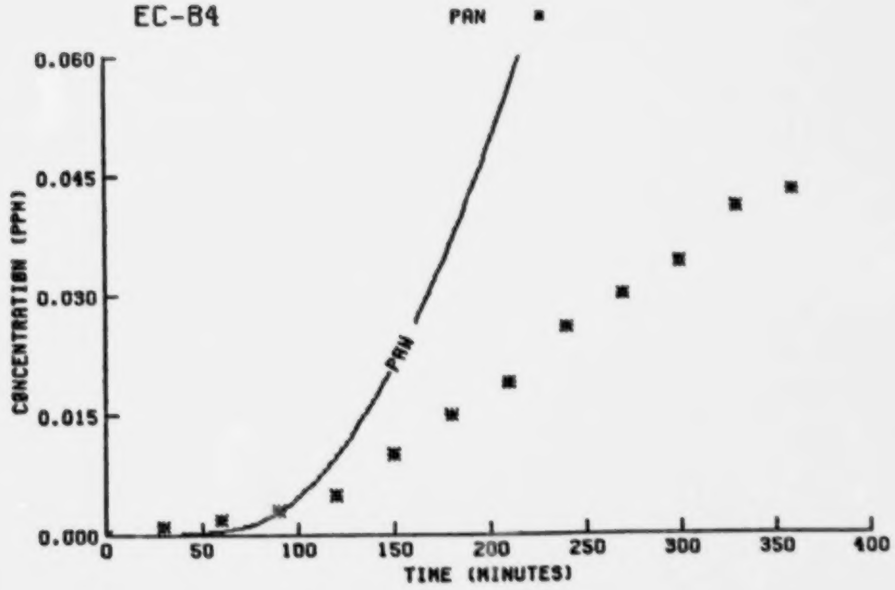


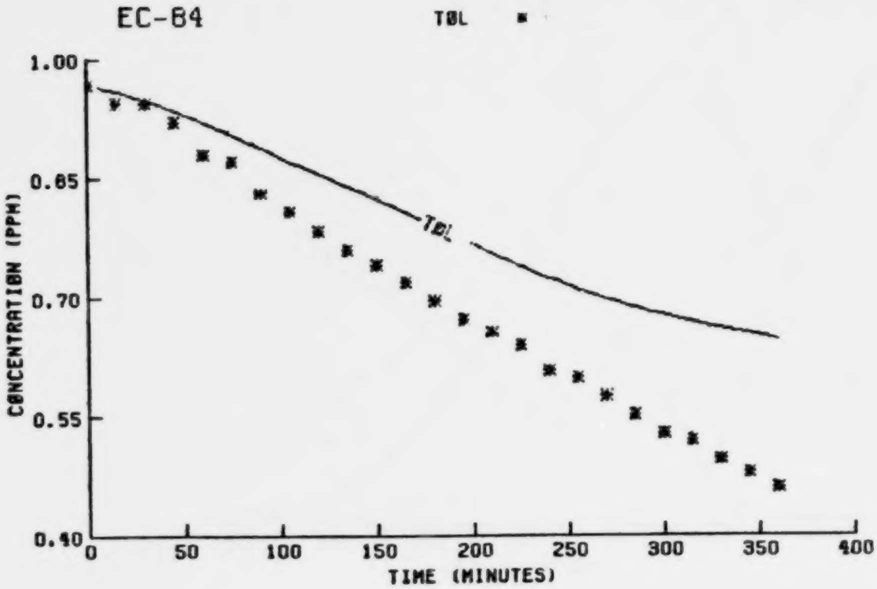
EC-83
PAN
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

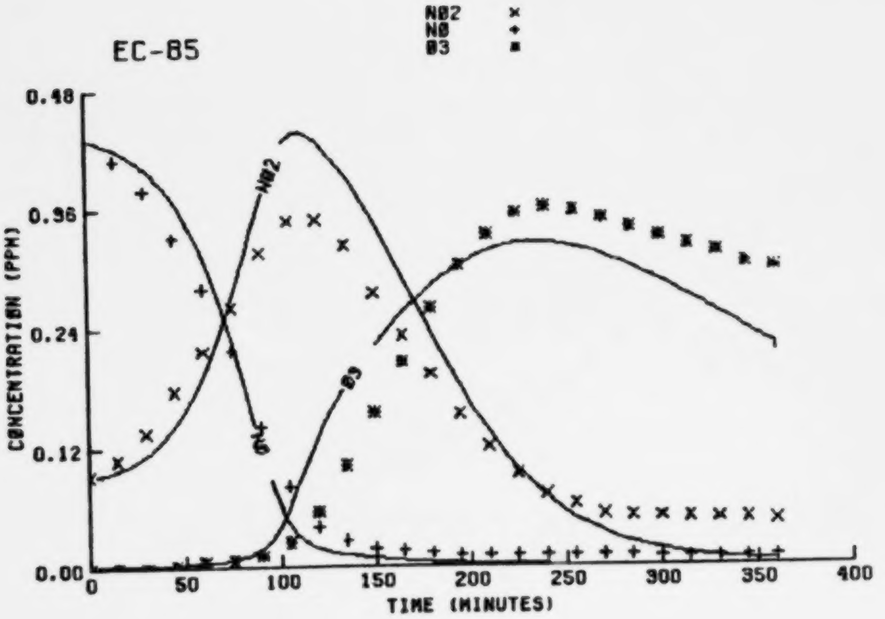


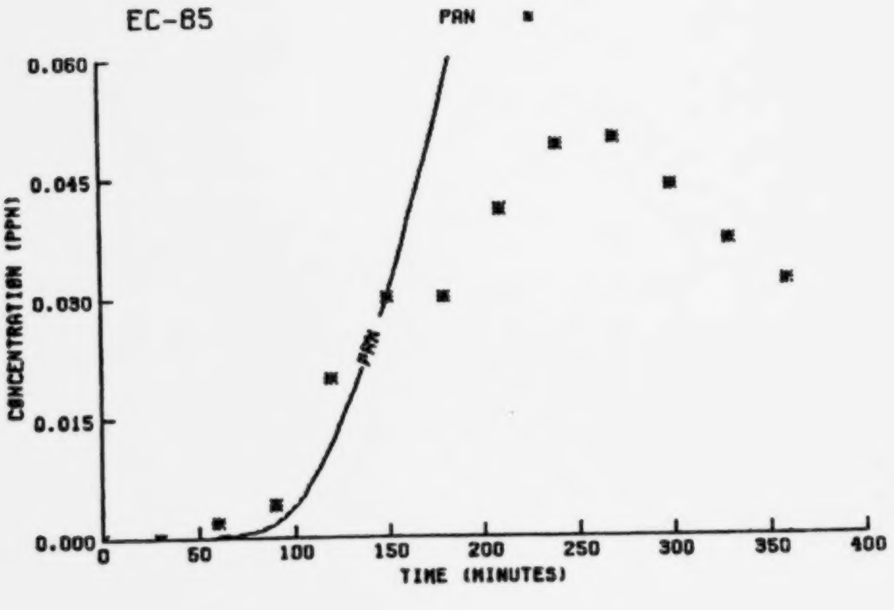
EC-83
TOL
6.00
5.40
4.80
4.20
3.60
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
TOL

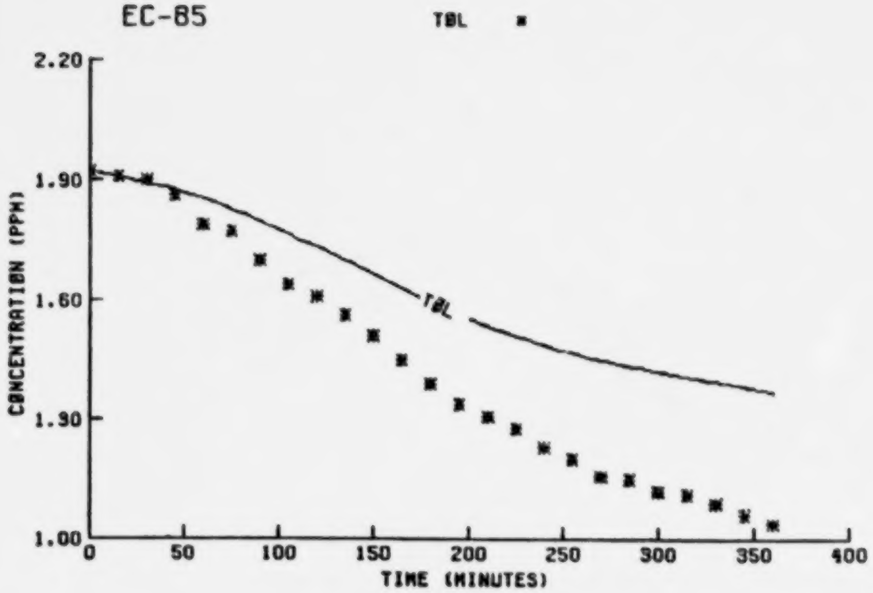

EC-84
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.00
0.10
0.20
0.30
0.40
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
NO2
NO
O3

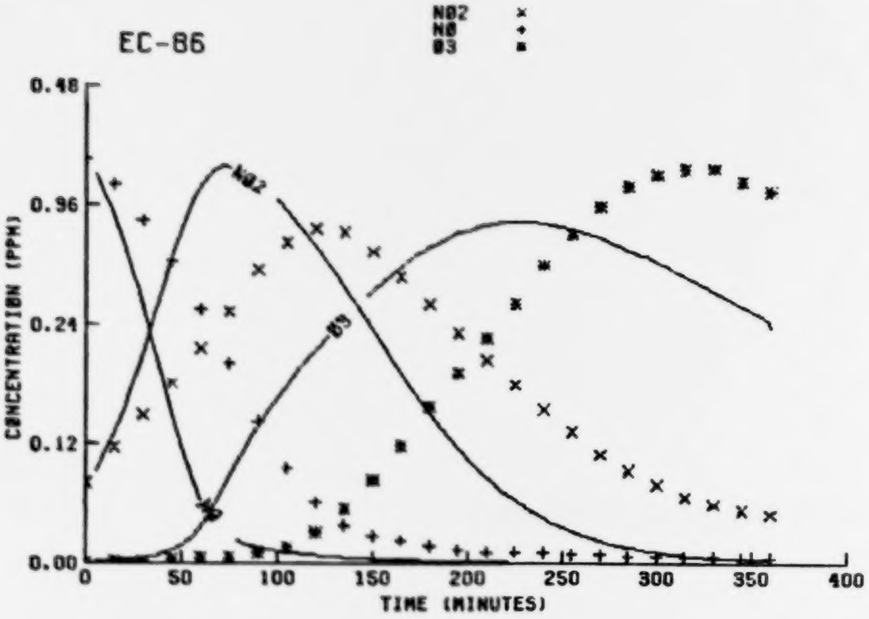

EC-84
PAN ✱
CONCENTRATION (PPM)
0.000
0.015
0.030
0.045
0.060
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
PAN

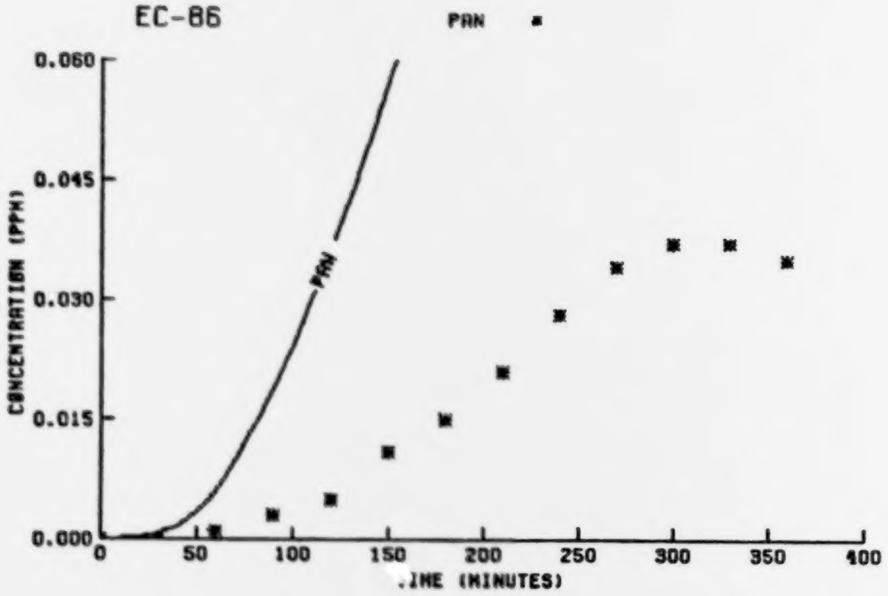

EC-84
TØL ✱
1.00
0.85
0.70
0.55
0.40
CØNCENTRATIØN (PPM)
TØL
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-85
NO2 ×
NO +
O3 *
NO2
NO
O3
CONCENTRATION (PPM)
0.48
0.36
0.24
0.12
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

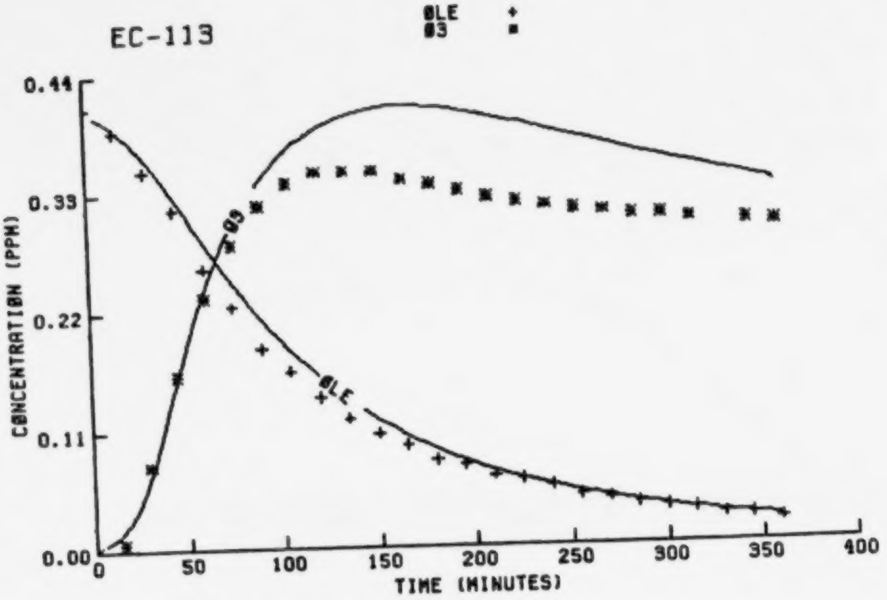

EC-85
PAN *
PAN
CONCENTRATION (PPM)
0.060
0.045
0.030
0.015
0.000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

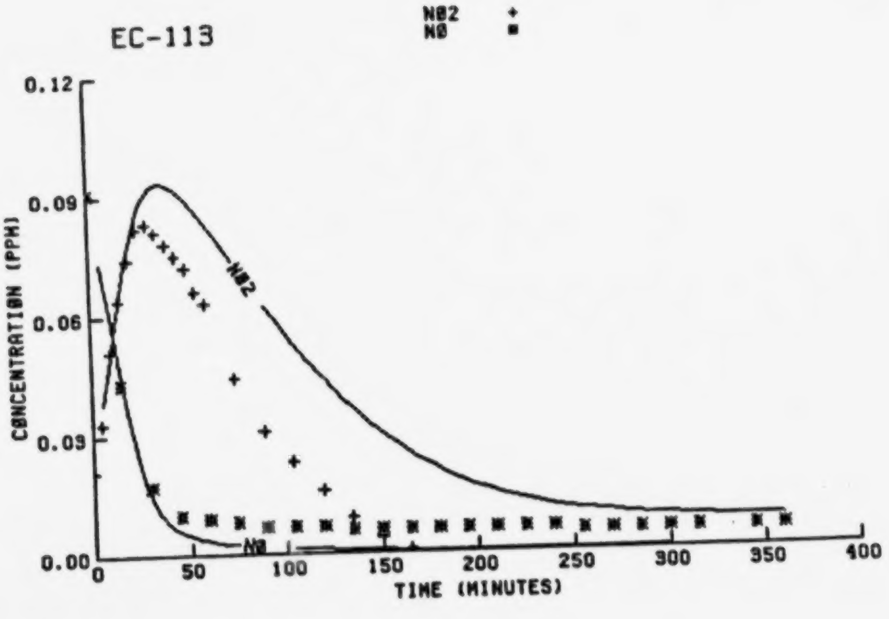

EC-85
TOL *
2.20
1.90
1.60
1.30
1.00
CONCENTRATION (PPM)
TOL
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

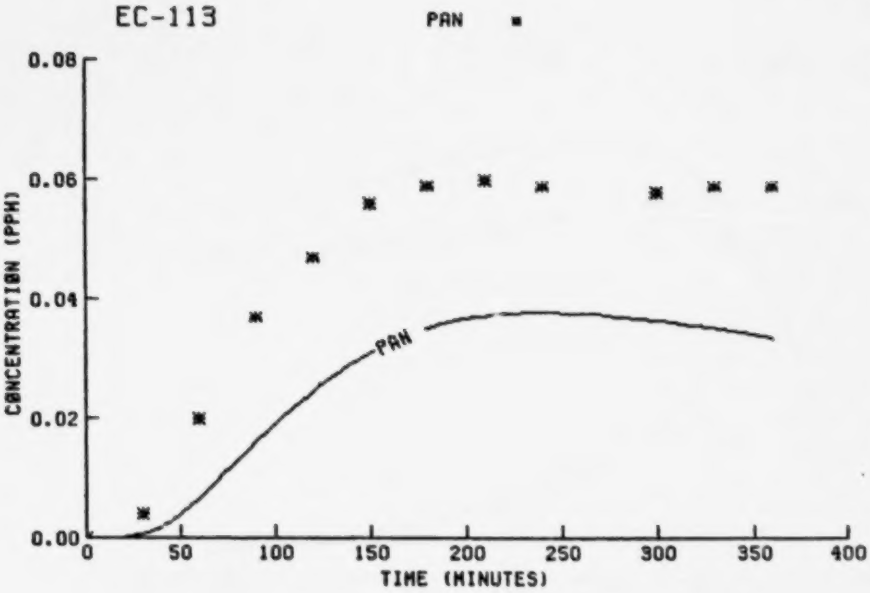

EC-86
NO2 ×
NO +
O3 ✱
0.48
0.96
0.24
0.12
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
O3

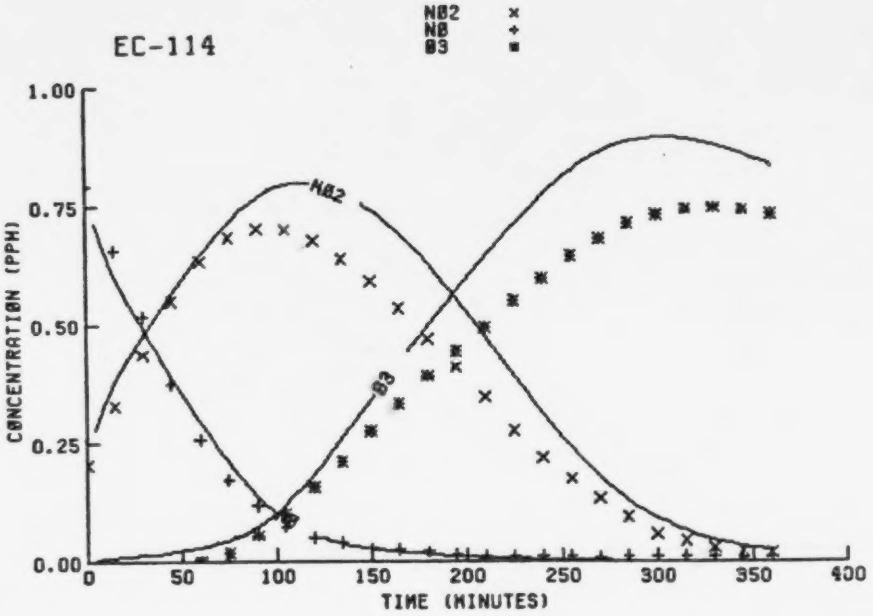

EC-86
PAN ✱
0.060
0.045
0.030
0.015
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

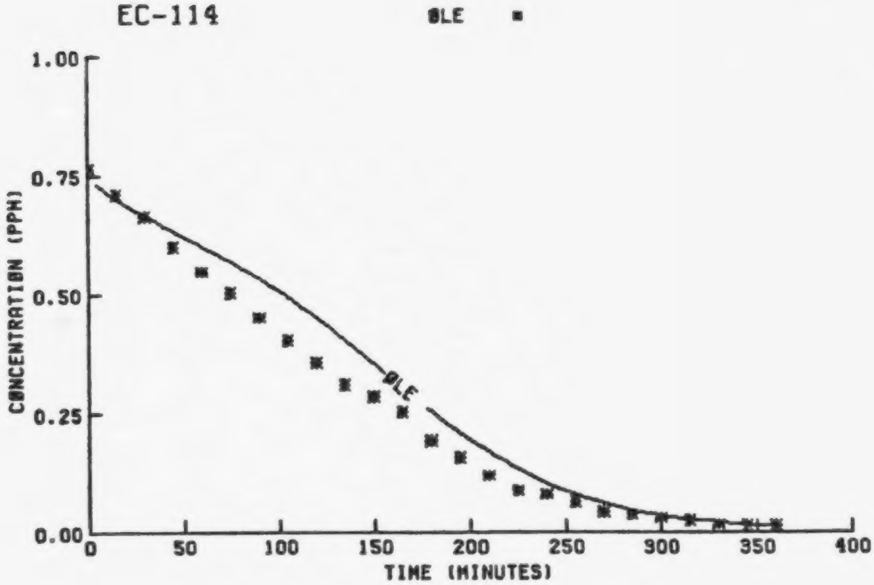
UCR PROPYLENE/BUTANE EXPERIMENTS

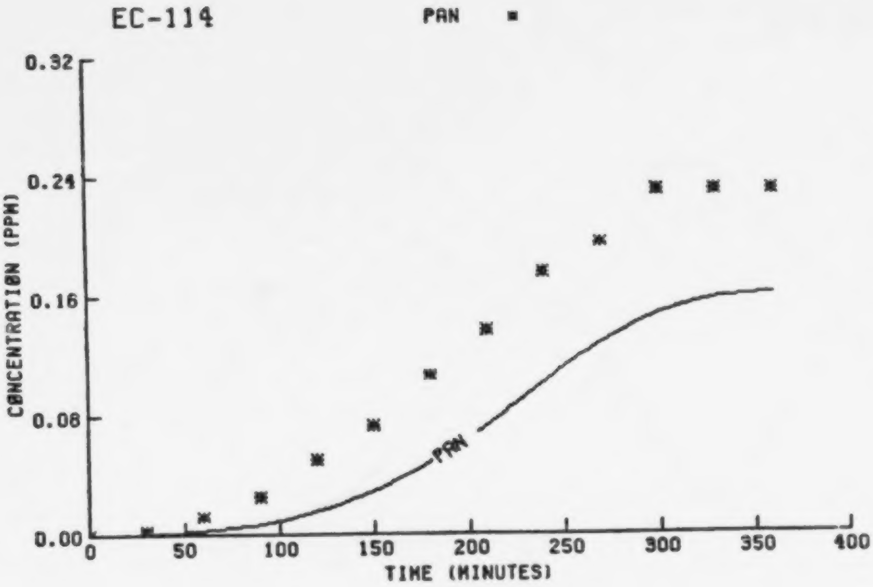

EC-113
0LE +
03 *
CONCENTRATION (PPM)
0.44
0.33
0.22
0.11
0.00
03
0LE
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-113
N02 +
N0 *
CONCENTRATION (PPM)
0.12
0.09
0.06
0.03
0.00
N02
N0
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

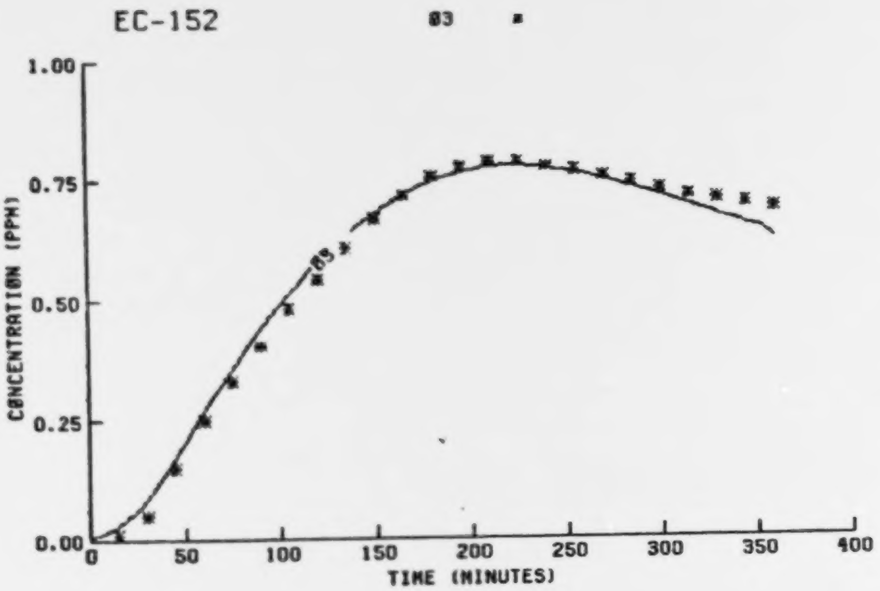

EC-113
PAN
0.08
0.06
0.04
0.02
0.00
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

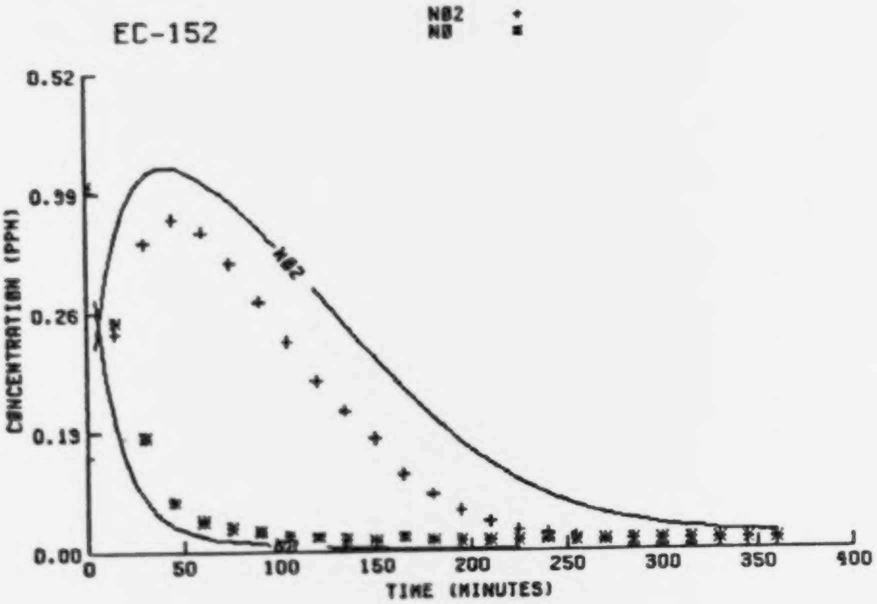

EC-114
NO2 ×
NO +
O3 ✱
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
O3

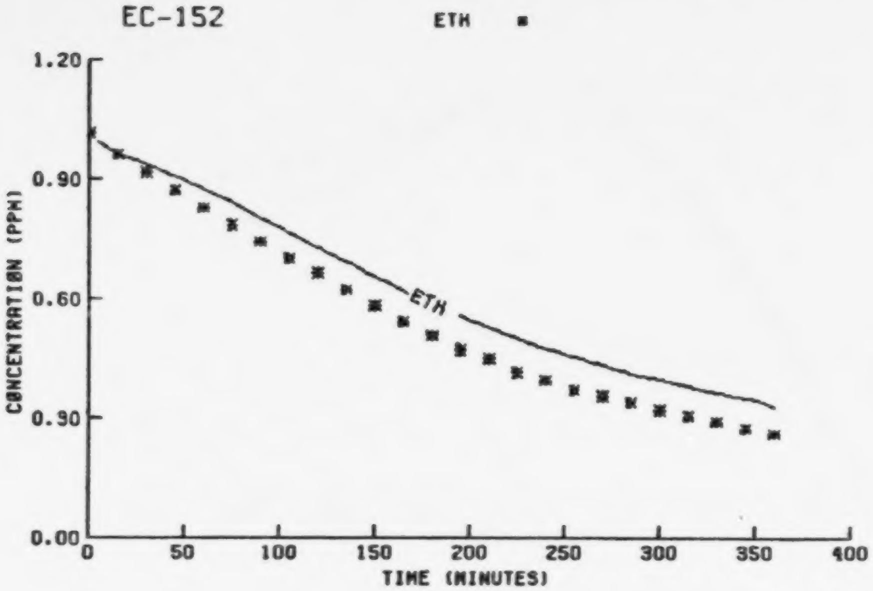

EC-114
OLE ✱
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
OLE

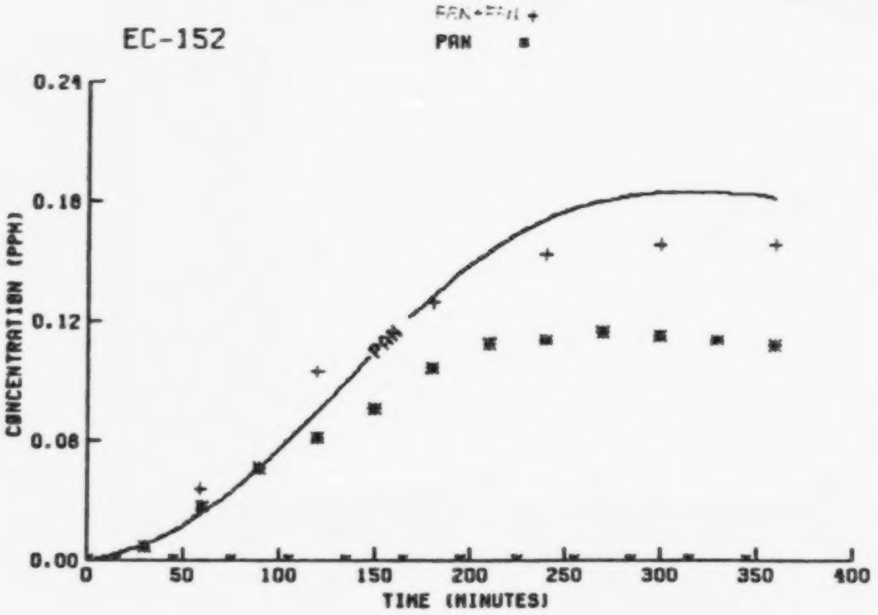

EC-114
PAN ✱
0.32
0.24
0.16
0.08
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

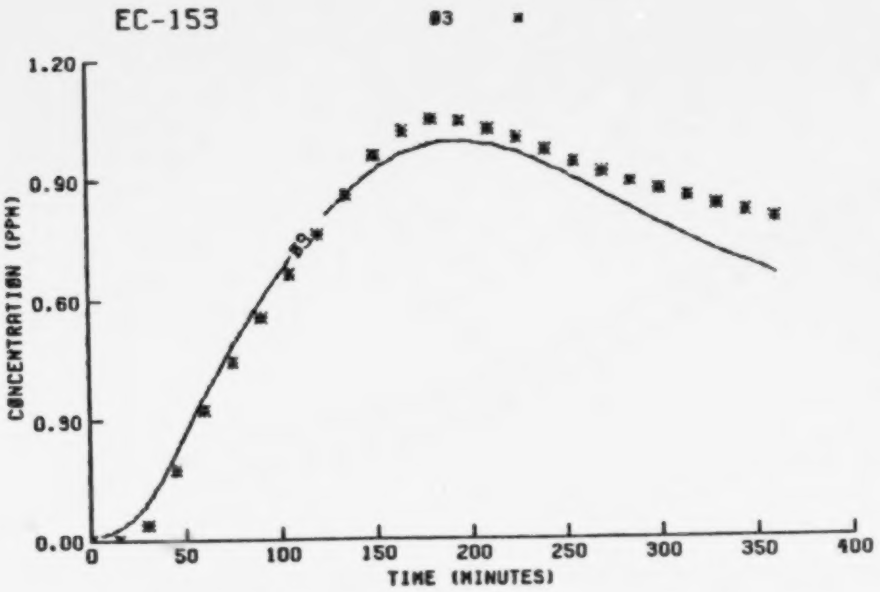
UCR MULTIOLEFIN EXPERIMENTS

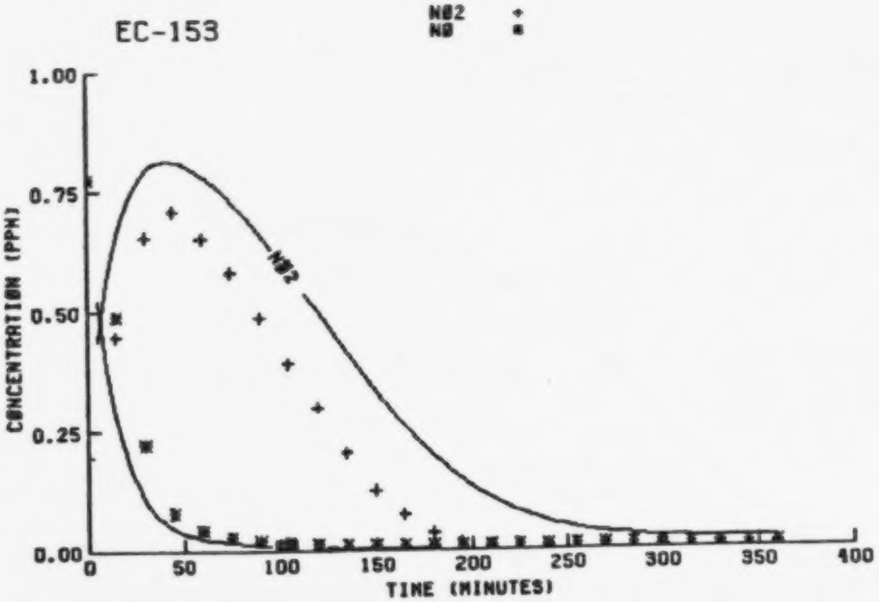

EC-152
O3 *
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
O3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

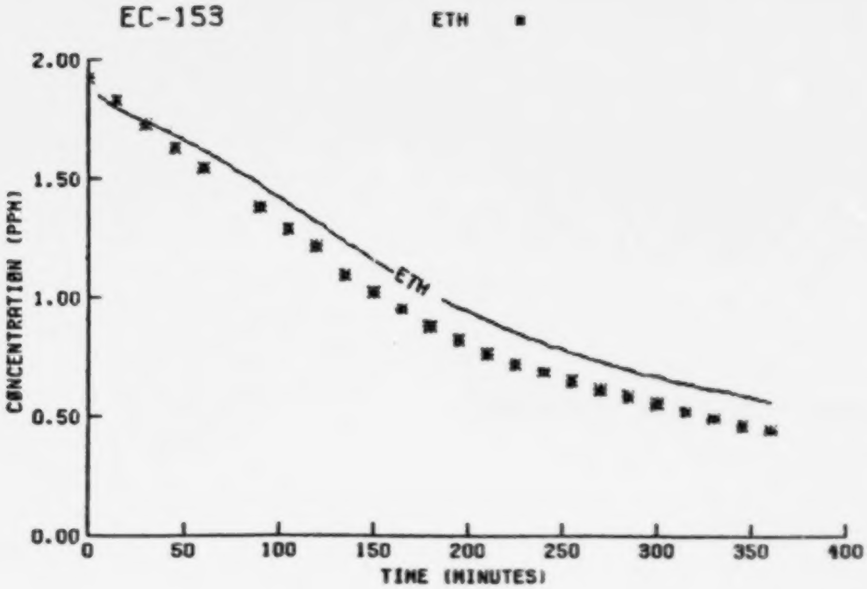

EC-152
NO2 +
NO *
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
NO2
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

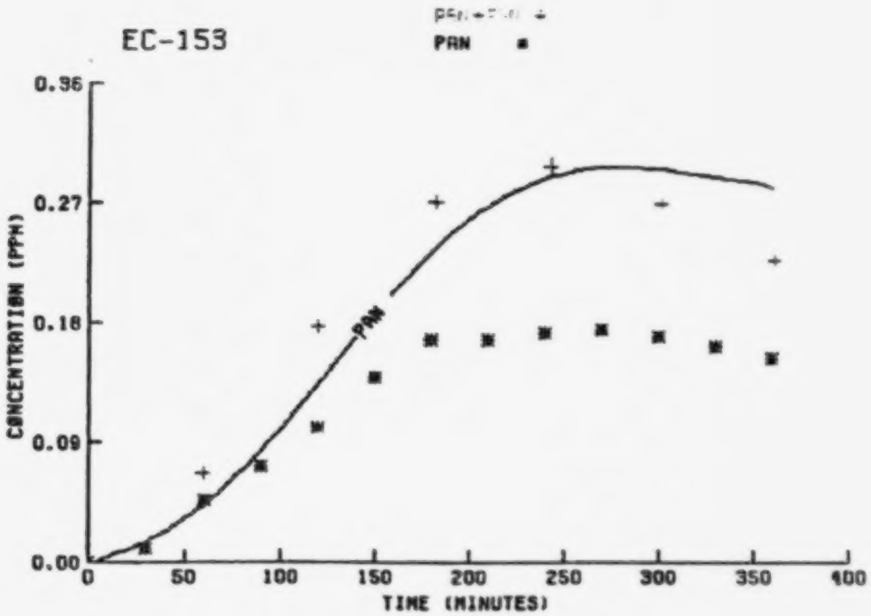

EC-152
ETH
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH


EC-152
PAN+PPN +
PAN
0.24
0.18
0.12
0.08
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

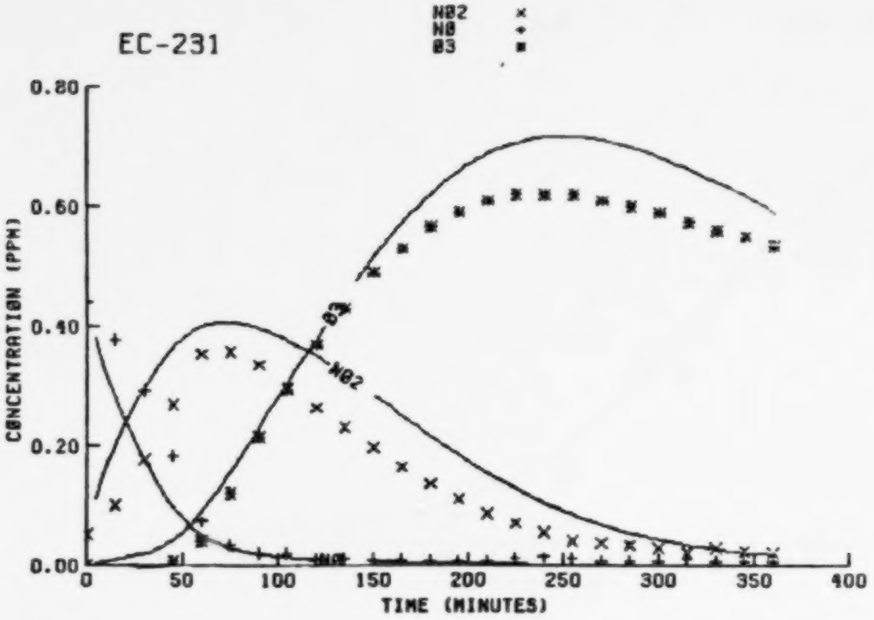

EC-153
Ø3 *
1.20
0.90
0.60
0.90
0.00
CØNCENTRATIØN (PPM)
Ø3
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

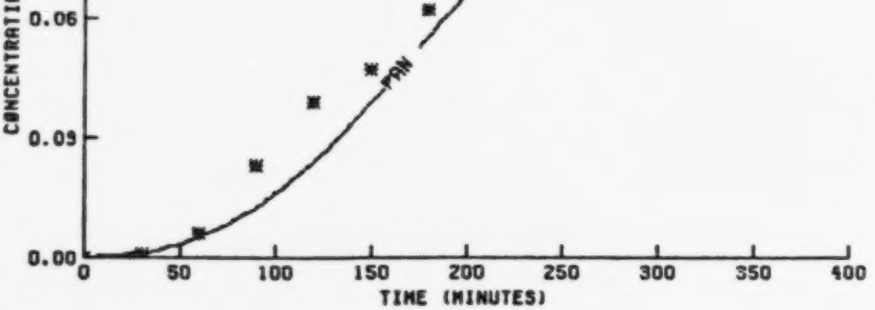

EC-153
NØ2 +
NØ *
1.00
0.75
0.50
0.25
0.00
CØNCENTRATIØN (PPM)
NØ2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

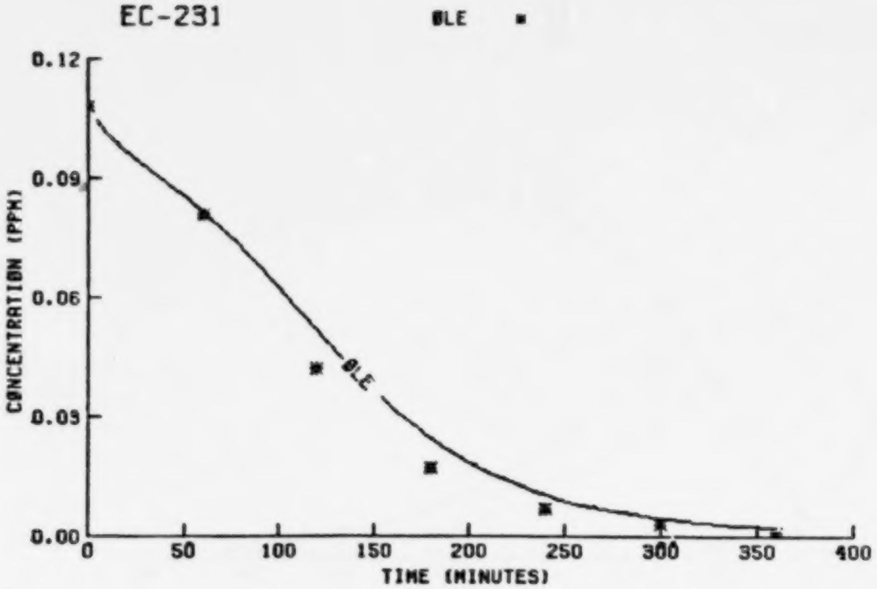

EC-153
ETH ■
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
ETH
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

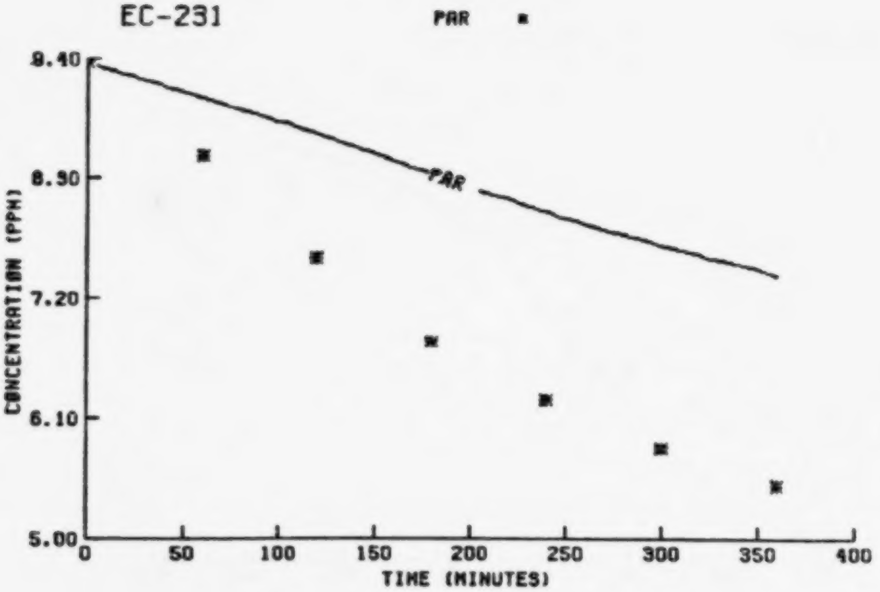

EC-153
PAN+PPN +
PAN ■
0.36
0.27
0.18
0.09
0.00
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

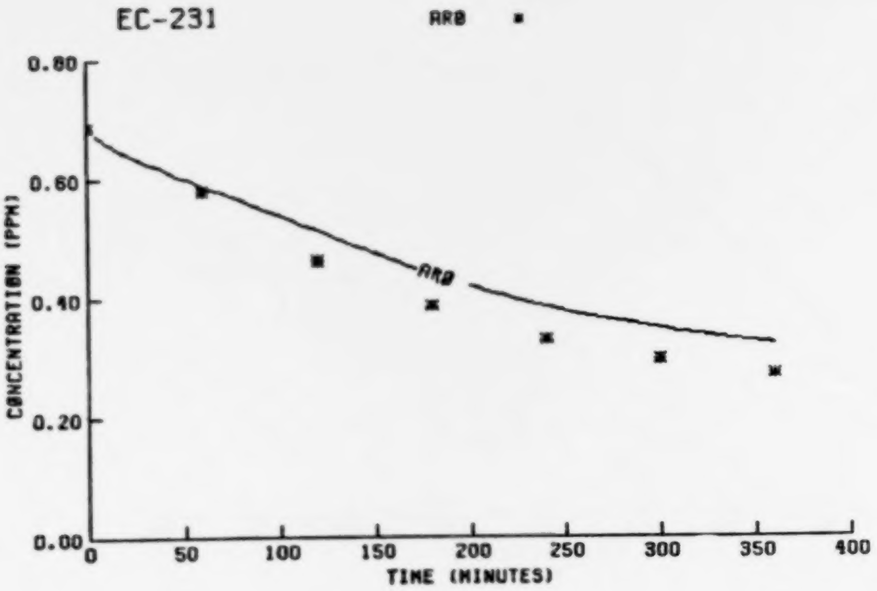
UCR SEVEN-HYDROCARBON EXPERIMENTS

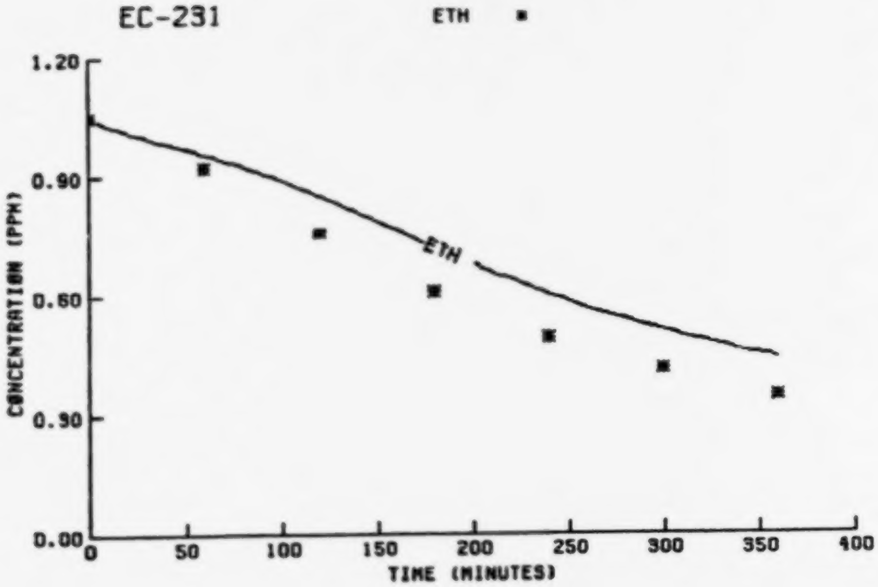

EC-231
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3
NO2

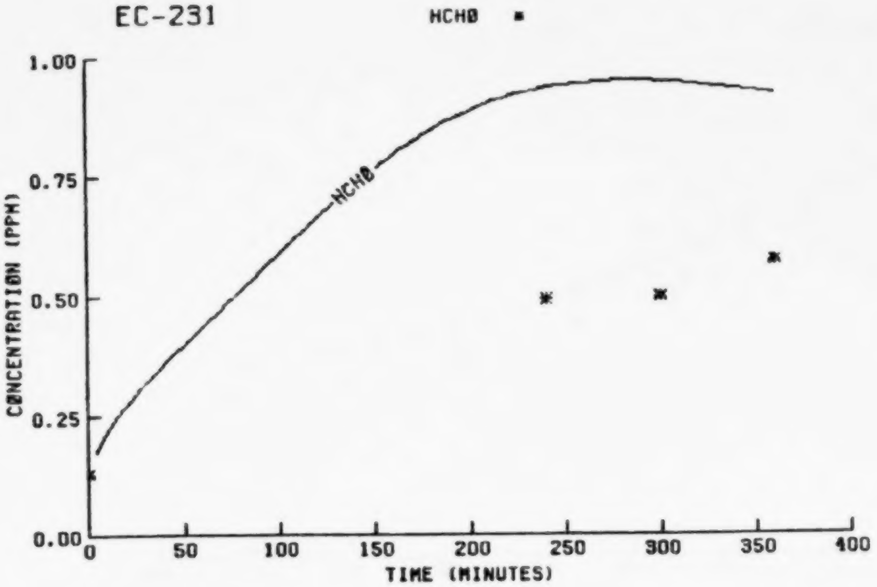

EC-231
PAN ✱
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN


EC-231
ØLE ✱
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ØLE

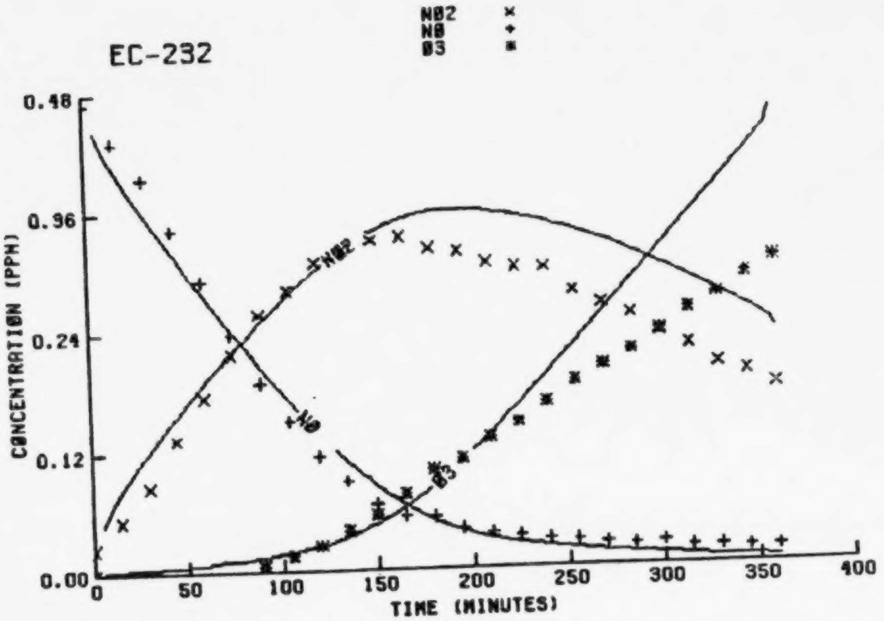

EC-231
PAR ✱
9.40
8.30
7.20
6.10
5.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAR


EC-231
ARB *
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
ARB
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

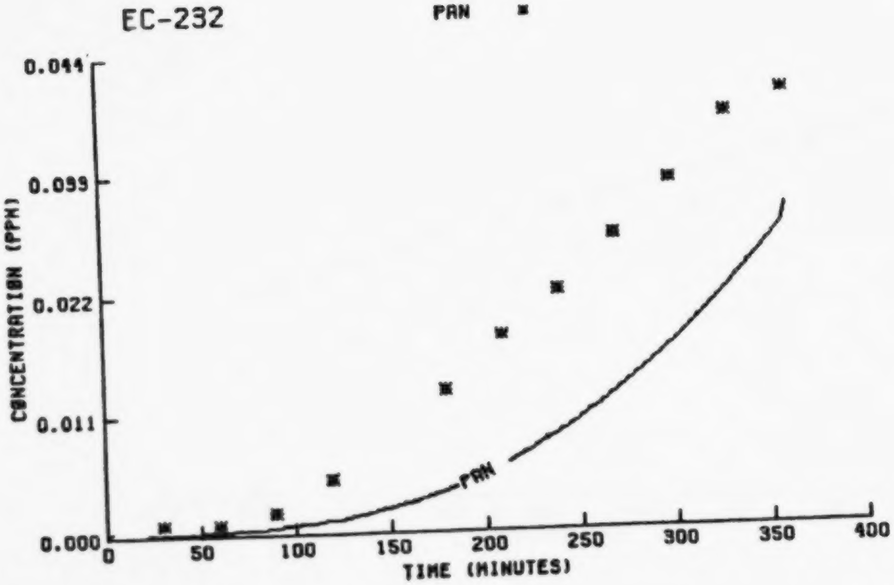

EC-231
ETH *
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
ETH
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

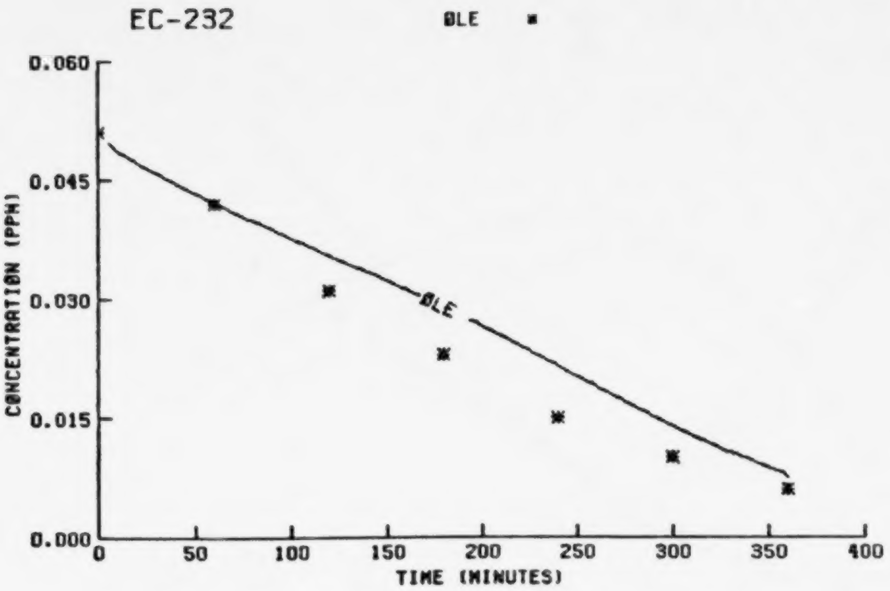

EC-231
HCHO *
HCHO
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

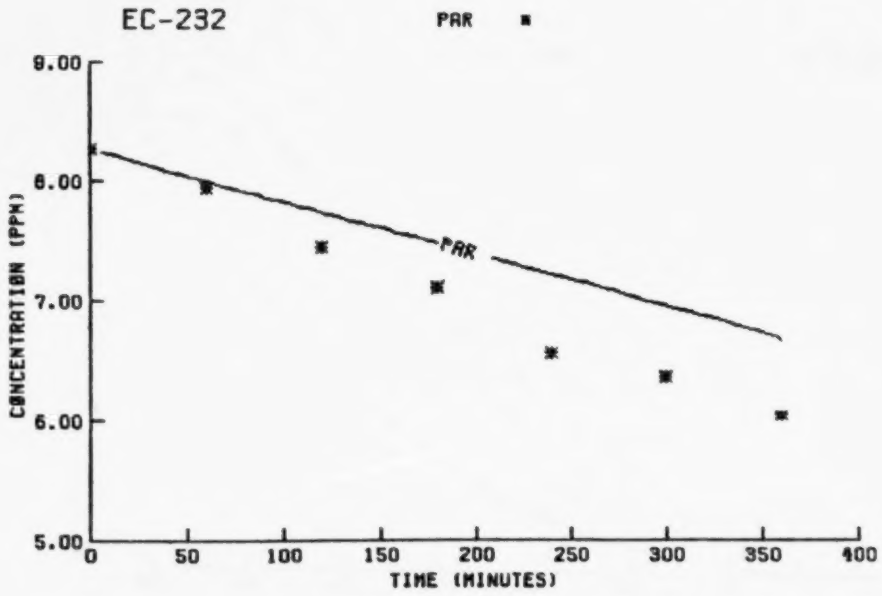
EC-232

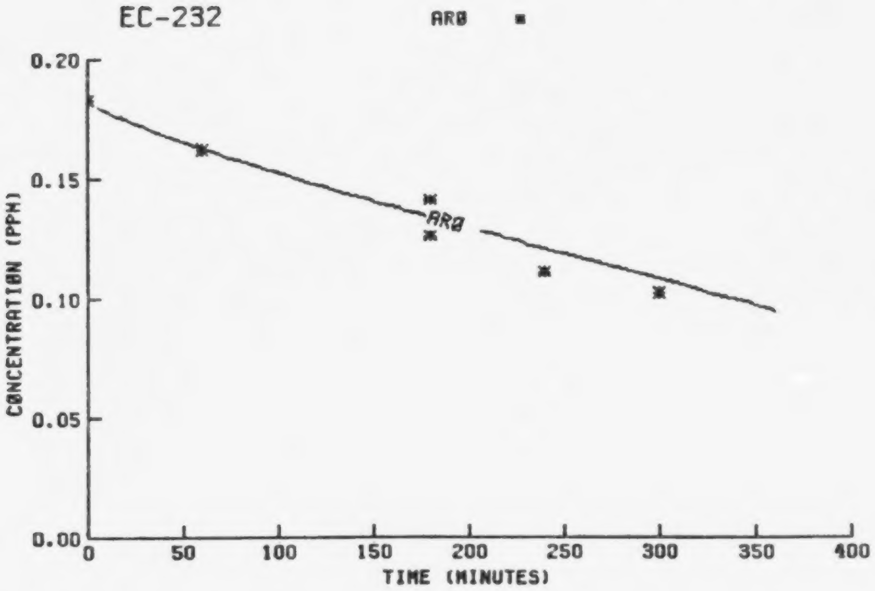

NO2 ×
NO +
O3 ✱
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3

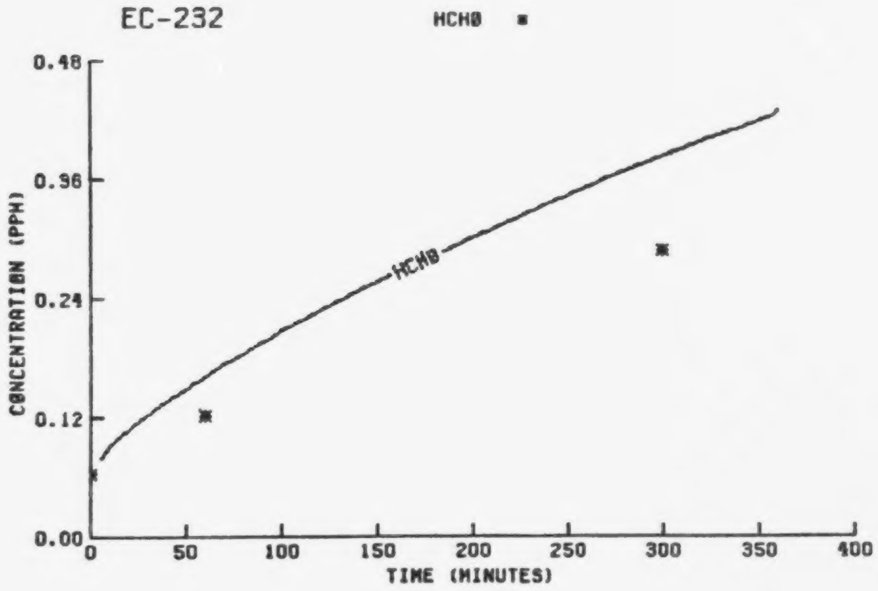
EC-232

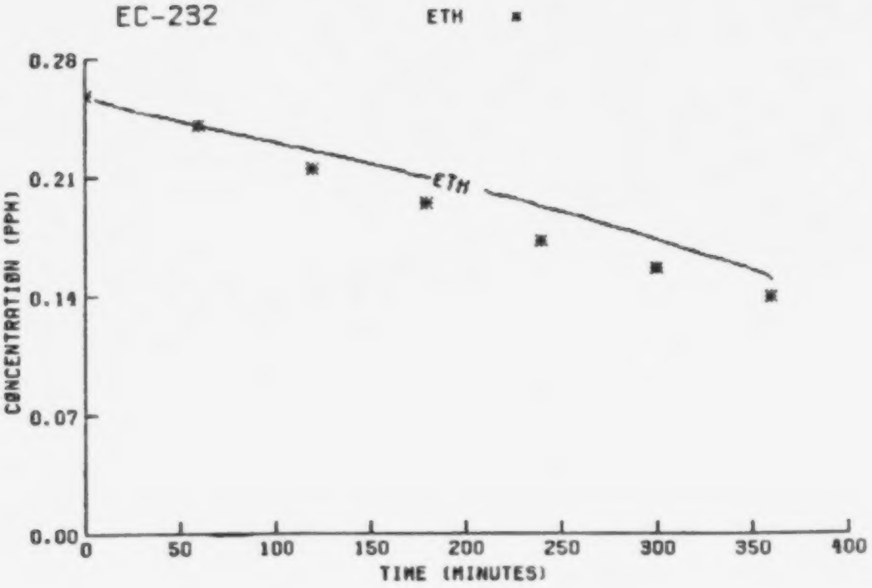

PAN ✱
0.044
0.033
0.022
0.011
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

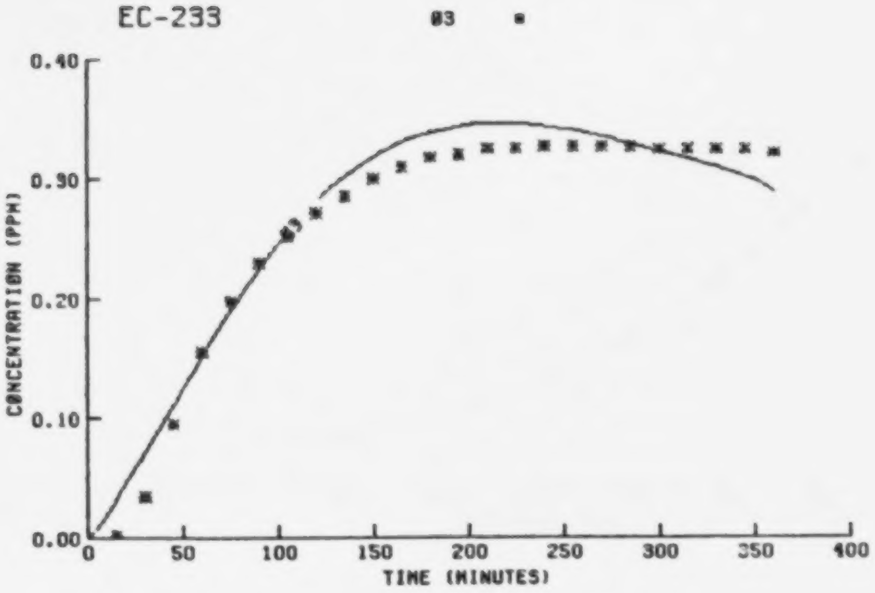

EC-232
ØLE *
CONCENTRATION (PPM)
0.060
0.045
0.030
0.015
0.000
ØLE
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-232
PAR *
CONCENTRATION (PPM)
9.00
8.00
7.00
6.00
5.00
PAR
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

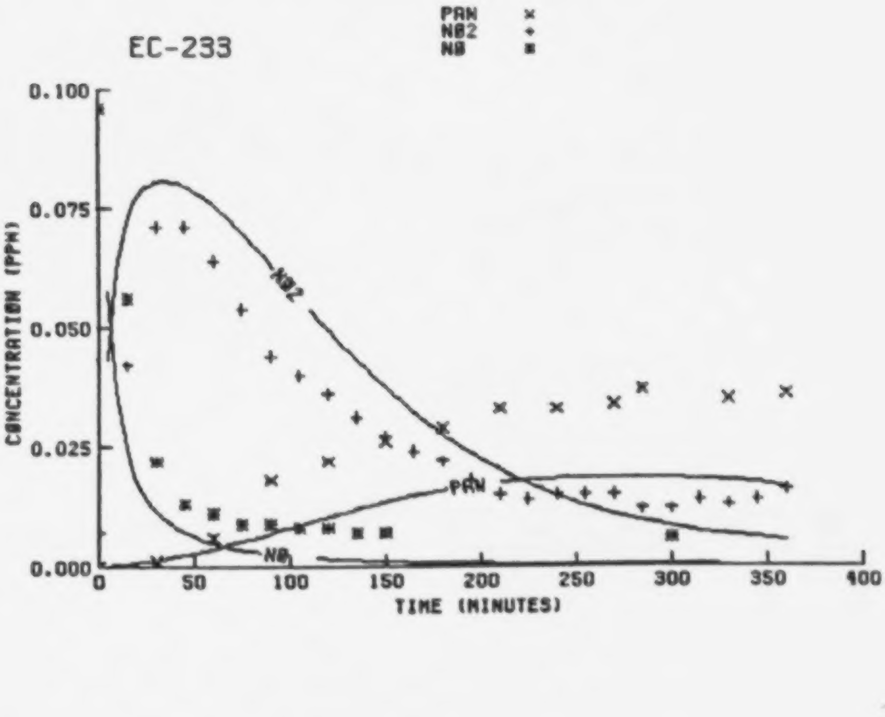

EC-232
ARO ✱
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPH)
ARO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-232
HCHO ✱
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPH)
HCHO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

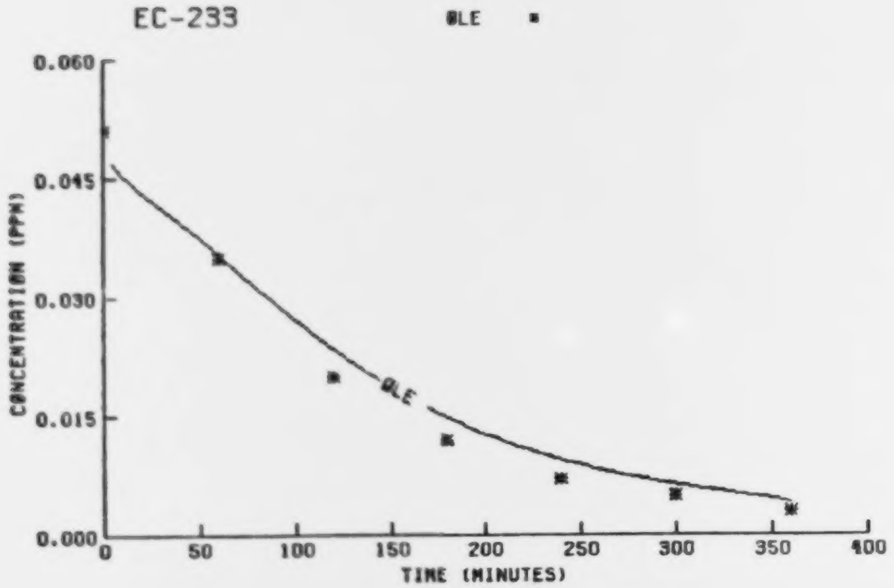

EC-232
ETH
CONCENTRATION (PPM)
0.28
0.21
0.14
0.07
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
ETH

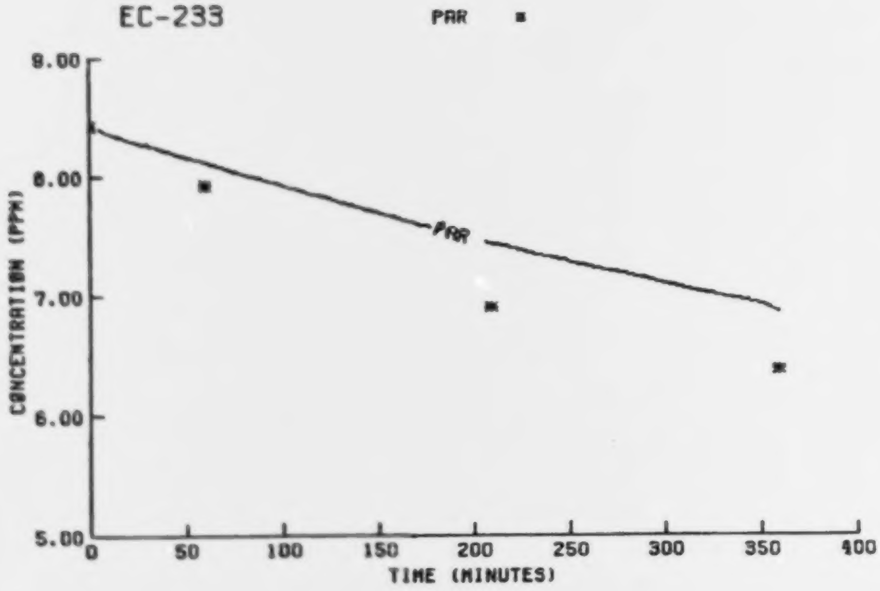


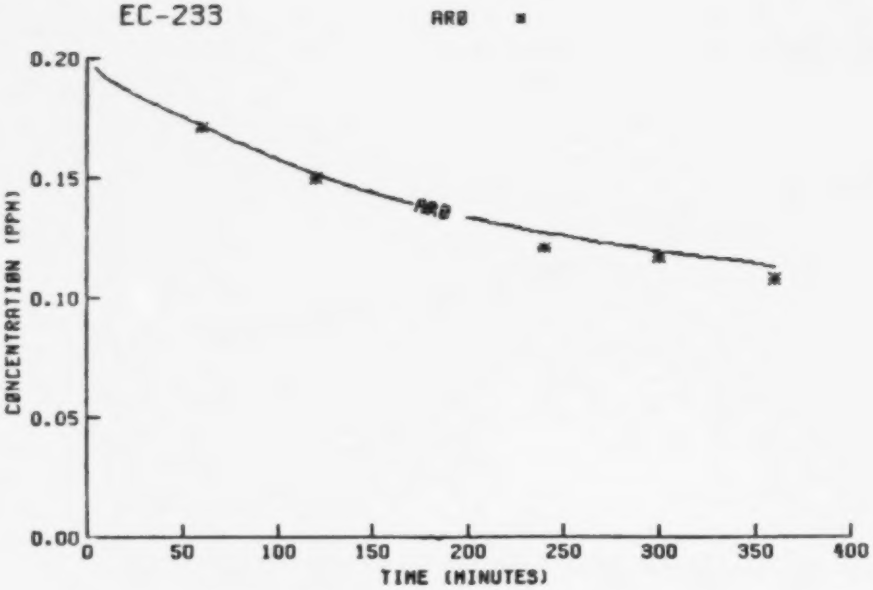
EC-233
Ø3 ✱
CONCENTRATIØN (PPM)
0.40
0.30
0.20
0.10
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
Ø3

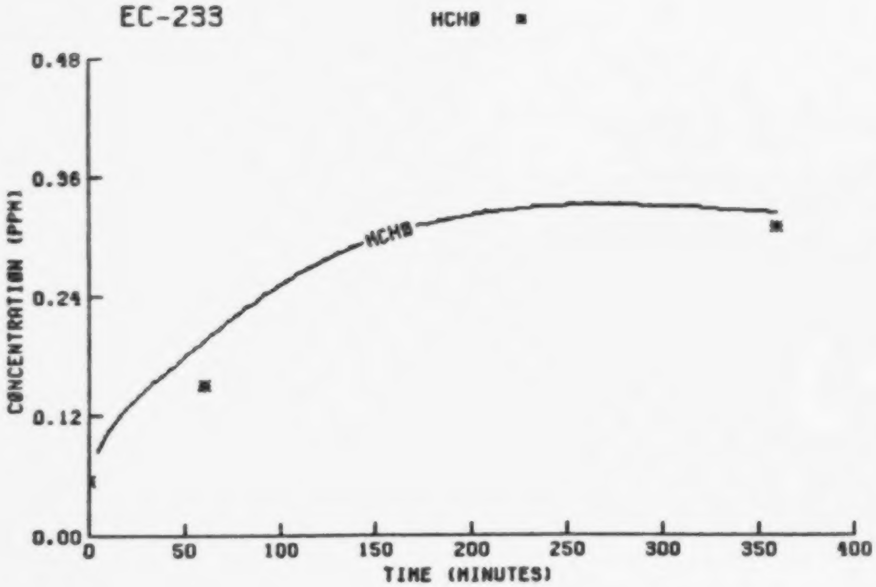


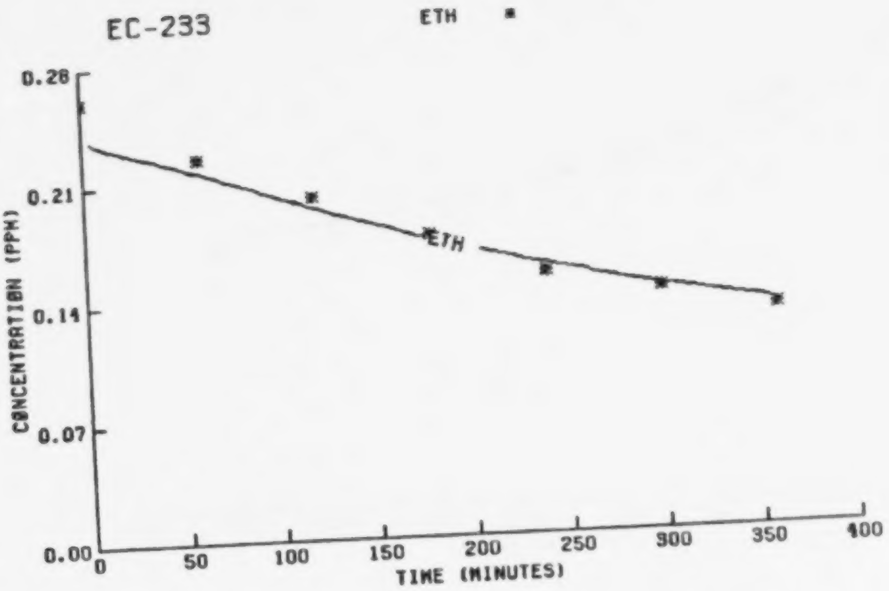
EC-233
PAN ×
NØ2 +
NØ ✱
CONCENTRATIØN (PPM)
0.100
0.075
0.050
0.025
0.000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NØ2
PAN
NØ

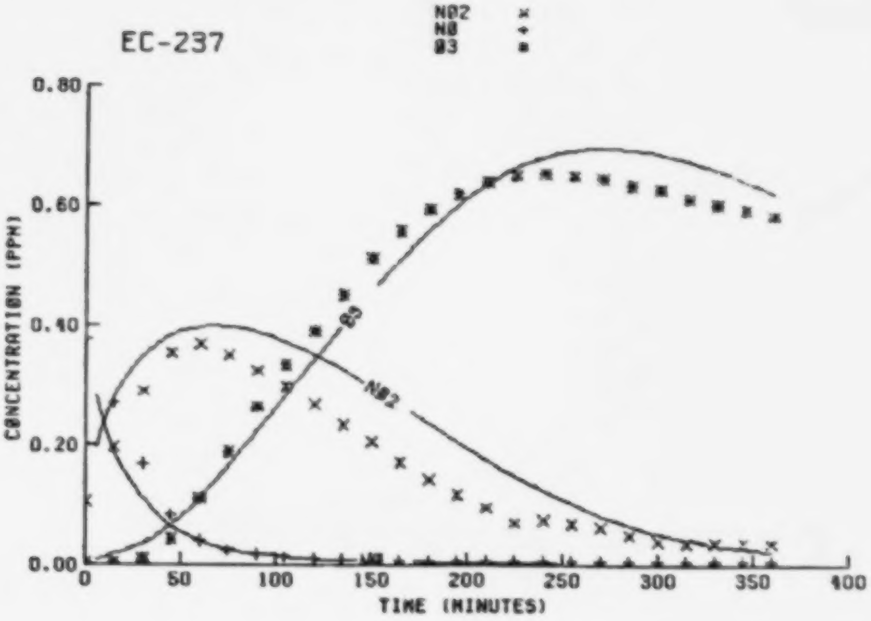

EC-233
OLE ■
CONCENTRATION (PPM)
0.060
0.045
0.030
0.015
0.000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
OLE

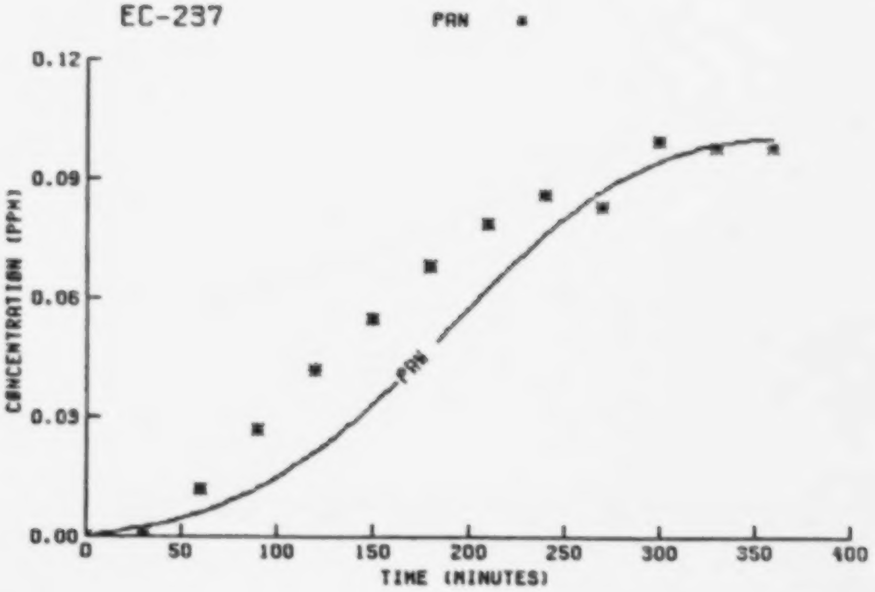

EC-233
PAR ■
CONCENTRATION (PPM)
9.00
8.00
7.00
6.00
5.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAR

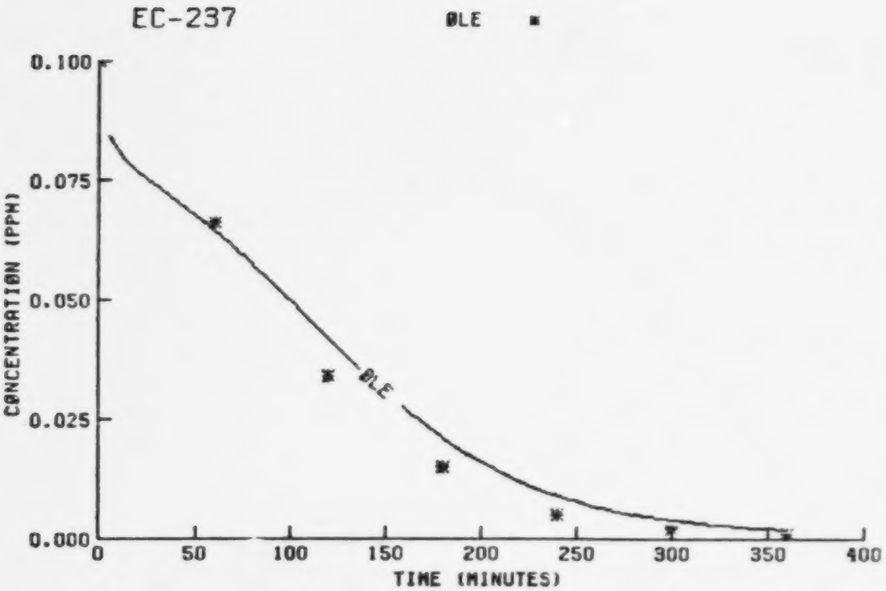

EC-233
ARO ✱
CONCENTRATION (PPM)
0.20
0.15
0.10
0.05
0.00
0 50 100 150 200 250 300 350 400
TIME (MINUTES)
ARO

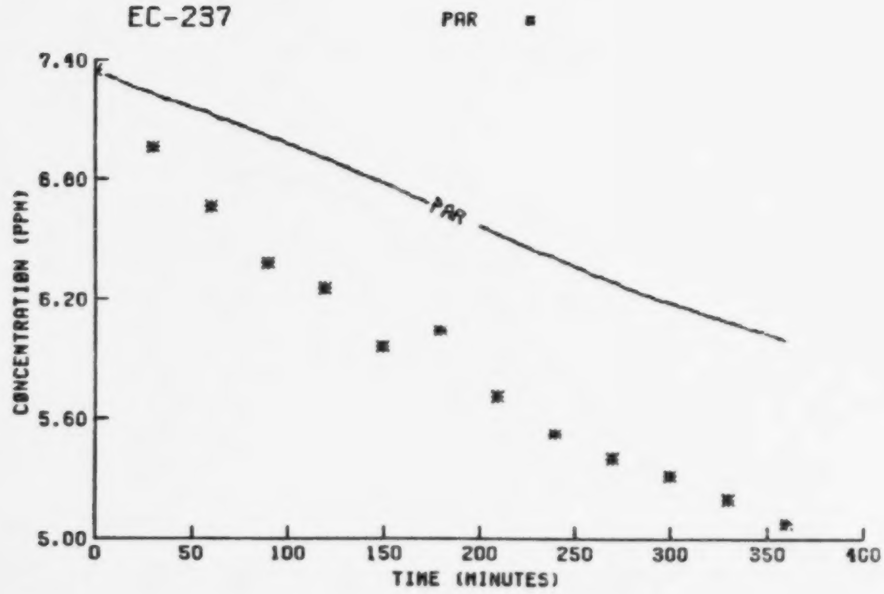

EC-233
HCHO ✱
CONCENTRATION (PPM)
0.48
0.36
0.24
0.12
0.00
0 50 100 150 200 250 300 350 400
TIME (MINUTES)
HCHO

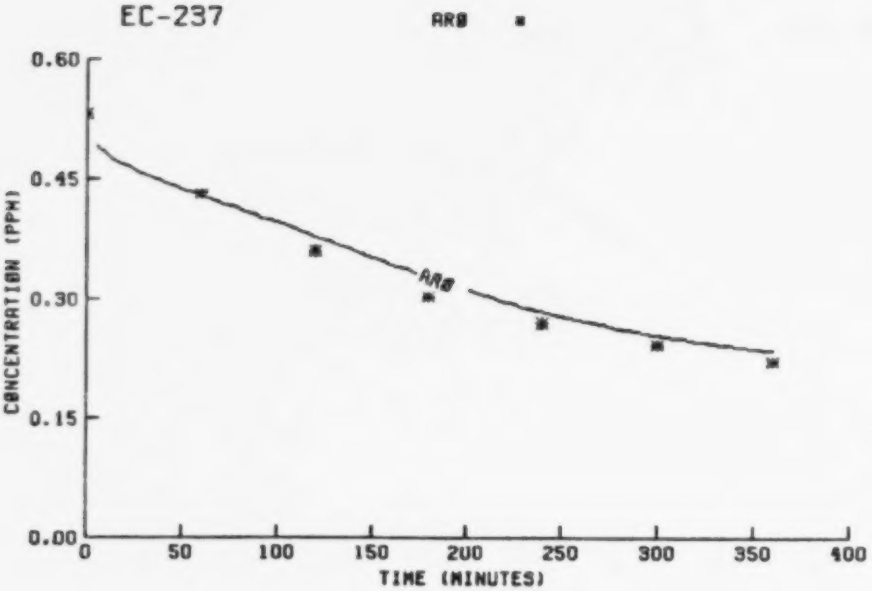

EC-233
ETH *
CONCENTRATION (PPM)
0.28
0.21
0.14
0.07
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

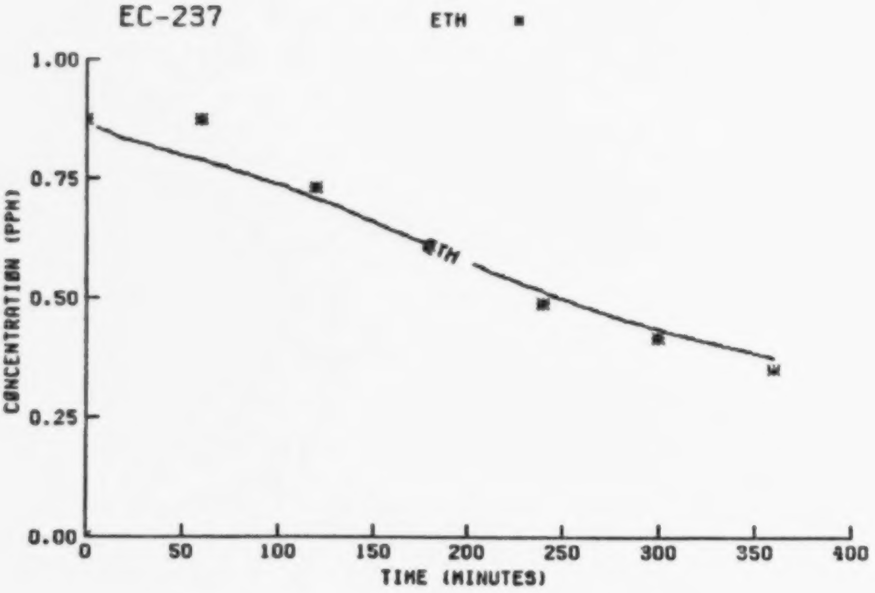

EC-237
NO2 ×
NO +
O3 ■
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3
NO2

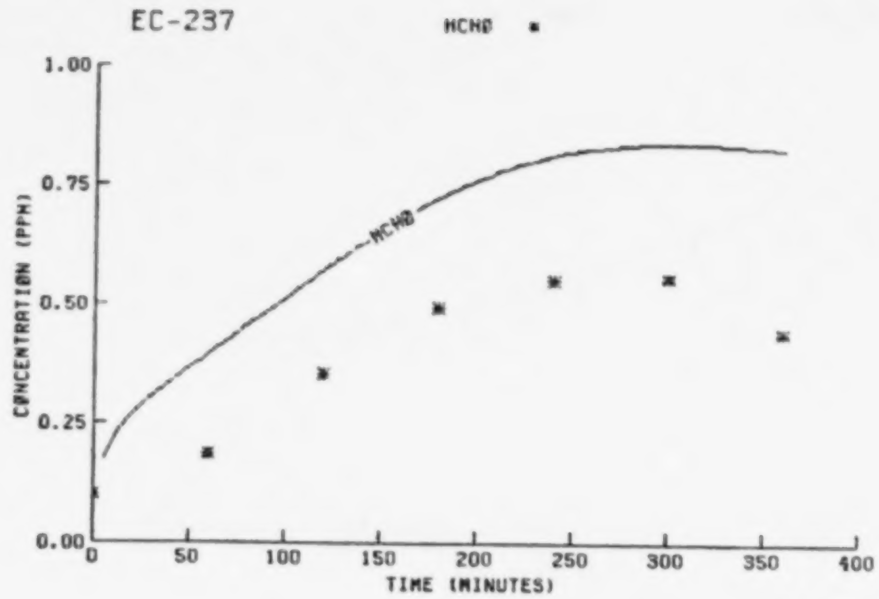

EC-237
PAN ■
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

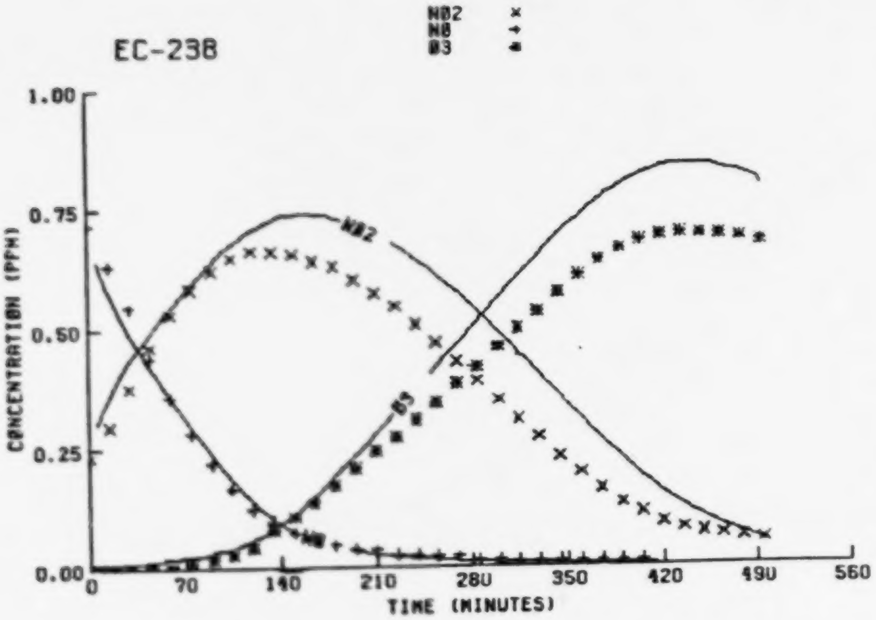

EC-237
ØLE ■
0.100
0.075
0.050
0.025
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ØLE

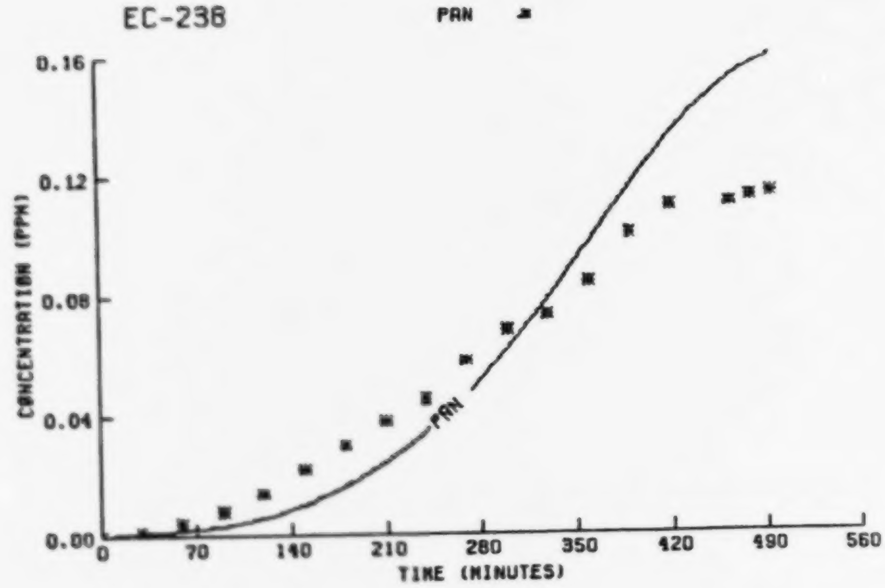

EC-237
PAR ■
7.40
6.80
6.20
5.60
5.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAR

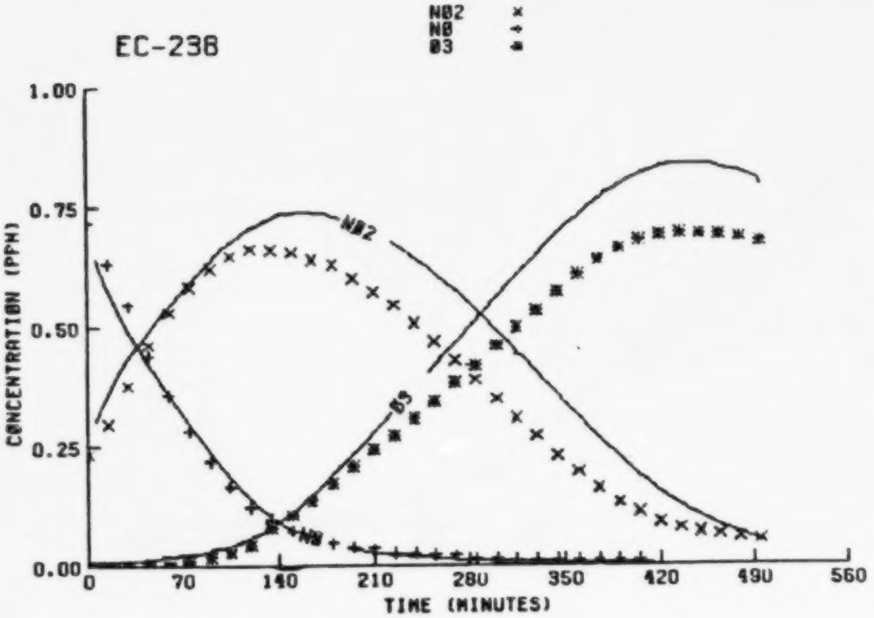

EC-237
ARØ *
0.60
0.45
0.30
0.15
0.00
CØNCENTRATIØN (PPM)
ARØ
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

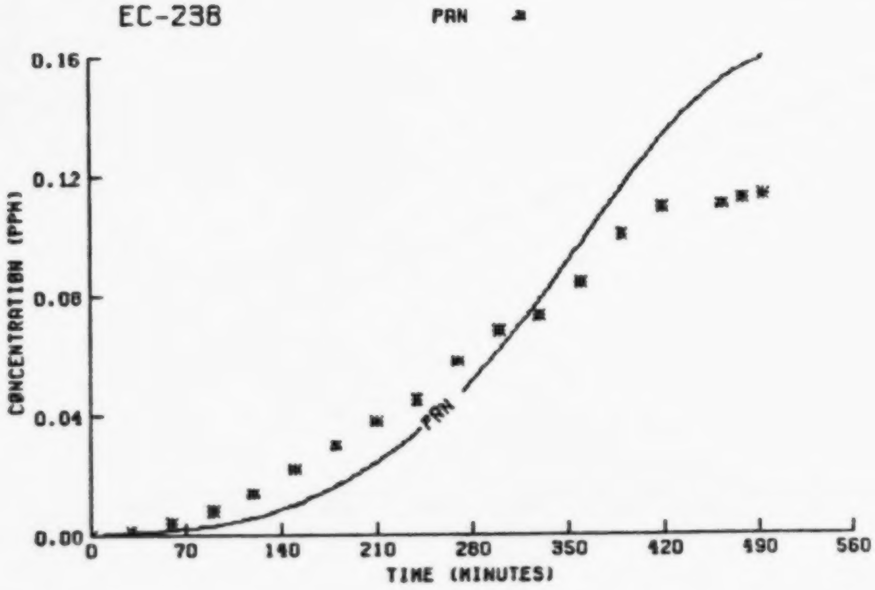

EC-237
ETH *
1.00
0.75
0.50
0.25
0.00
CØNCENTRATIØN (PPM)
ETH
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

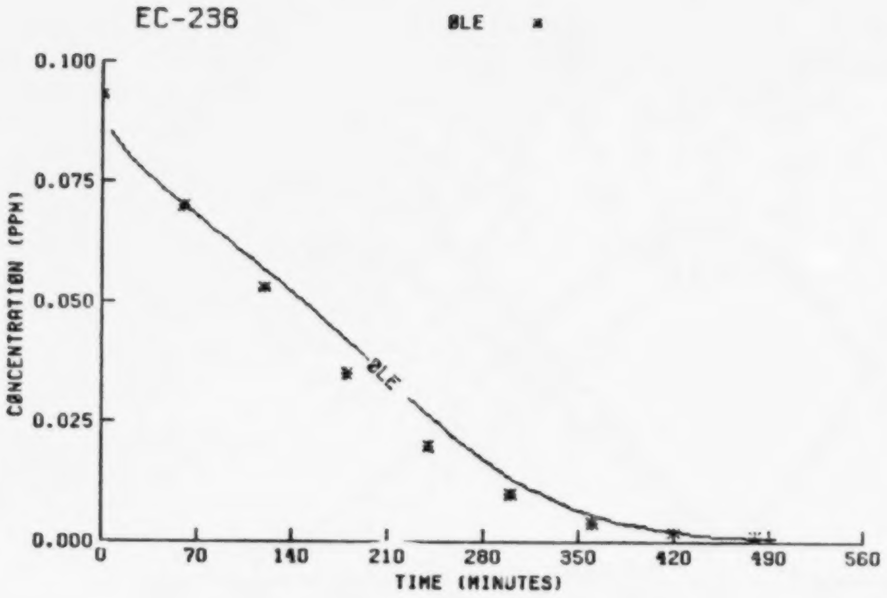

EC-237
HCHO *
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
HCHO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

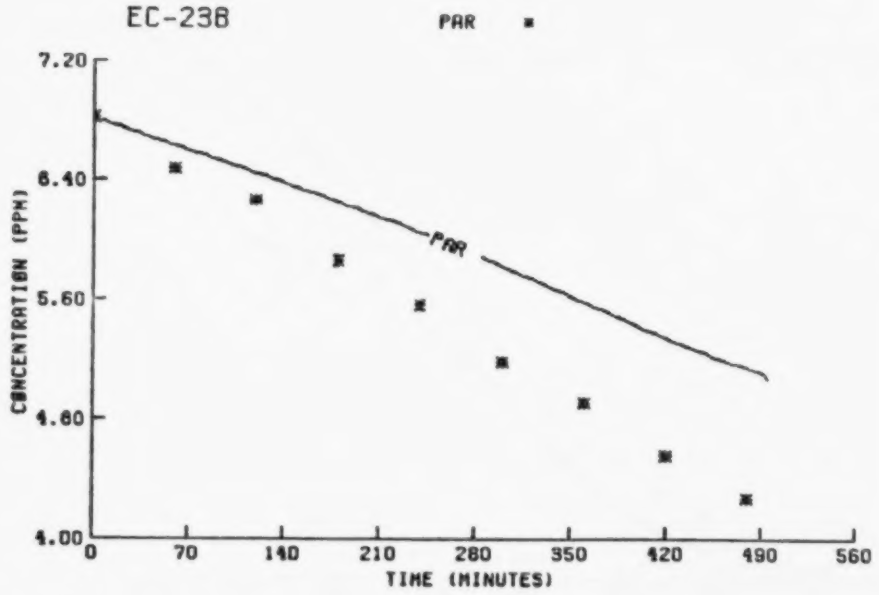

EC-238
NO2 ×
NO +
O3 ✱
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
NO2
O3

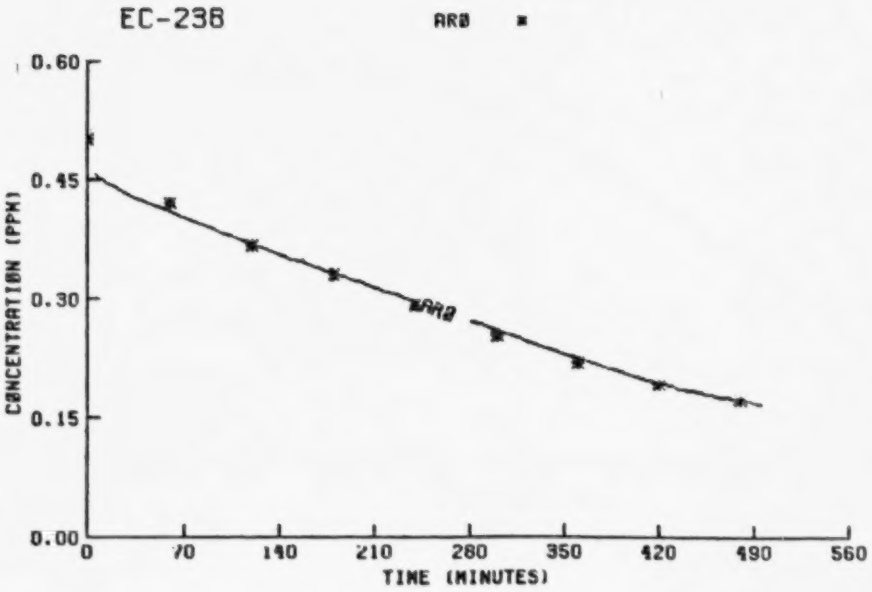

EC-238
PAN ✱
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
PAN


EC-238
NØ2 ×
NØ +
Ø3 ✱
1.00
0.75
0.50
0.25
0.00
CØNCENTRATIØN (PPM)
NØ2
Ø3
NØ
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

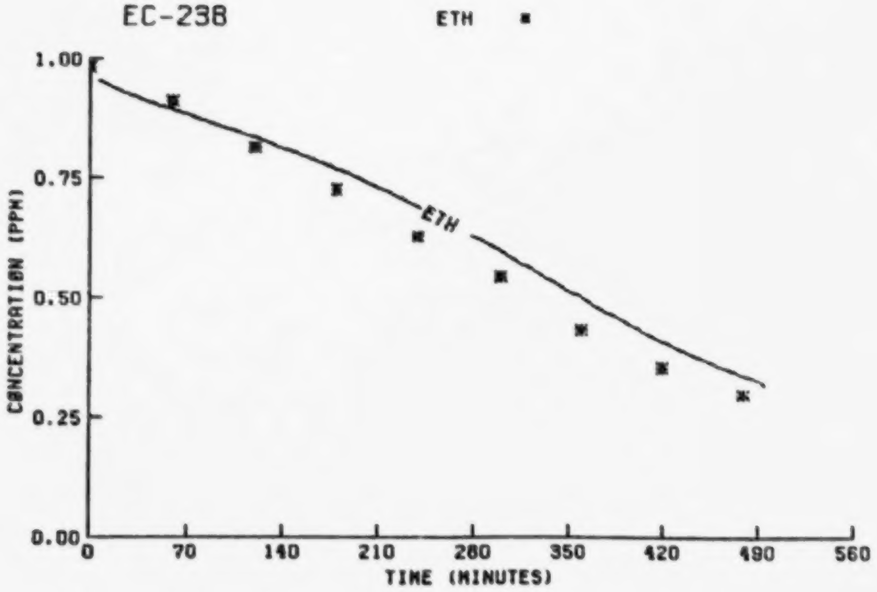

EC-238
PAN ✱
0.16
0.12
0.08
0.04
0.00
CØNCENTRATIØN (PPM)
PAN
0
70
140
210
280
350
420
490
560
TIME (MINUTES)


EC-238
OLE *
CONCENTRATION (PPM)
0.100
0.075
0.050
0.025
0.000
OLE
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

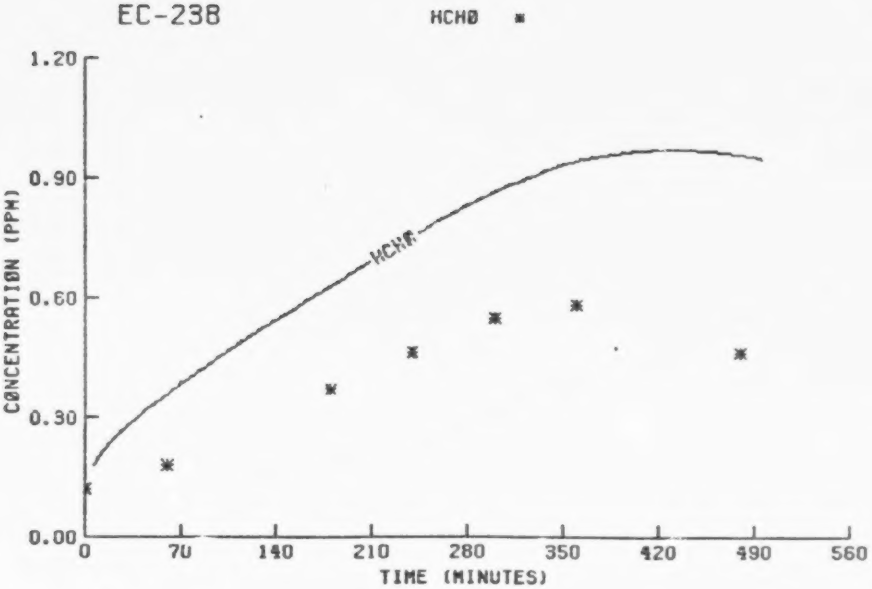

EC-238
PAR *
CONCENTRATION (PPM)
7.20
6.40
5.60
4.80
4.00
PAR
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

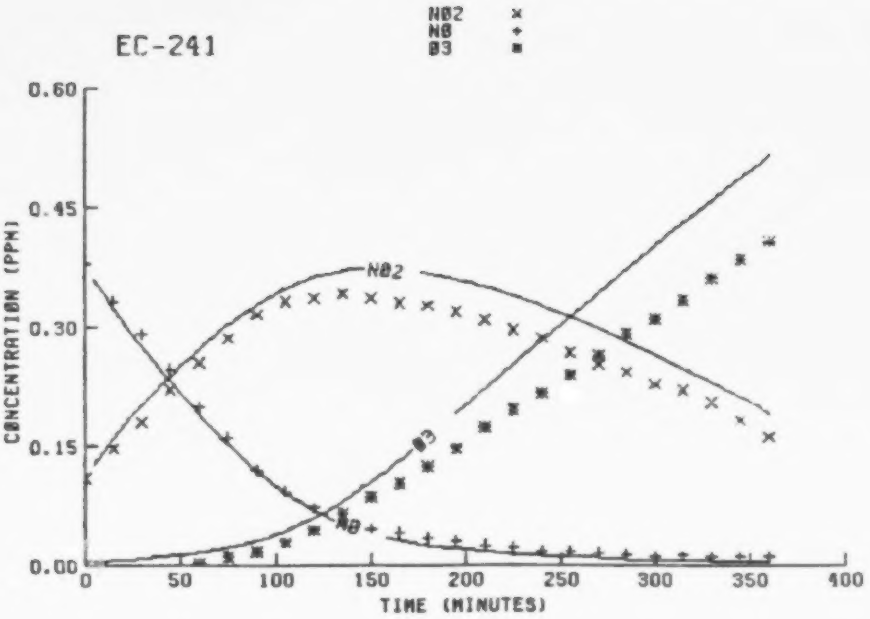


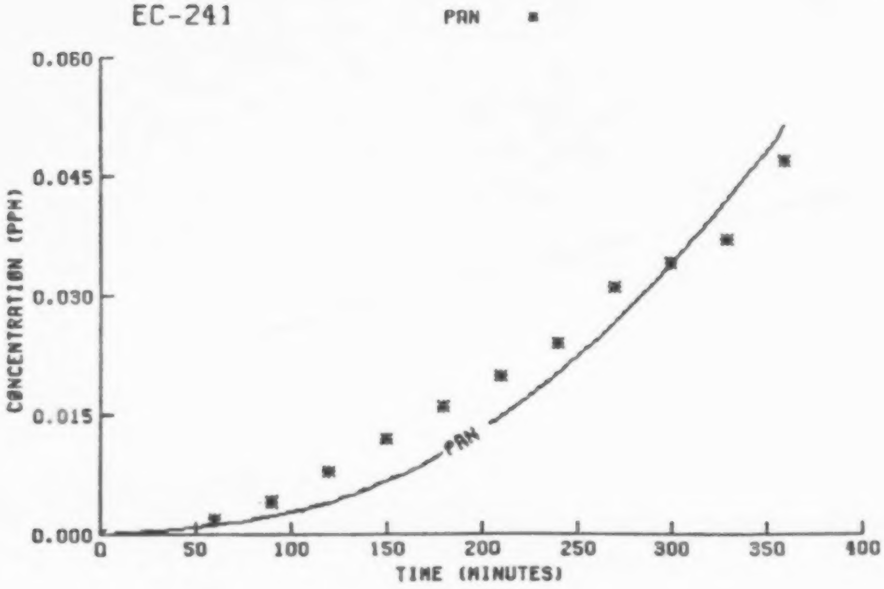
EC-238
ARO *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
ARO
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

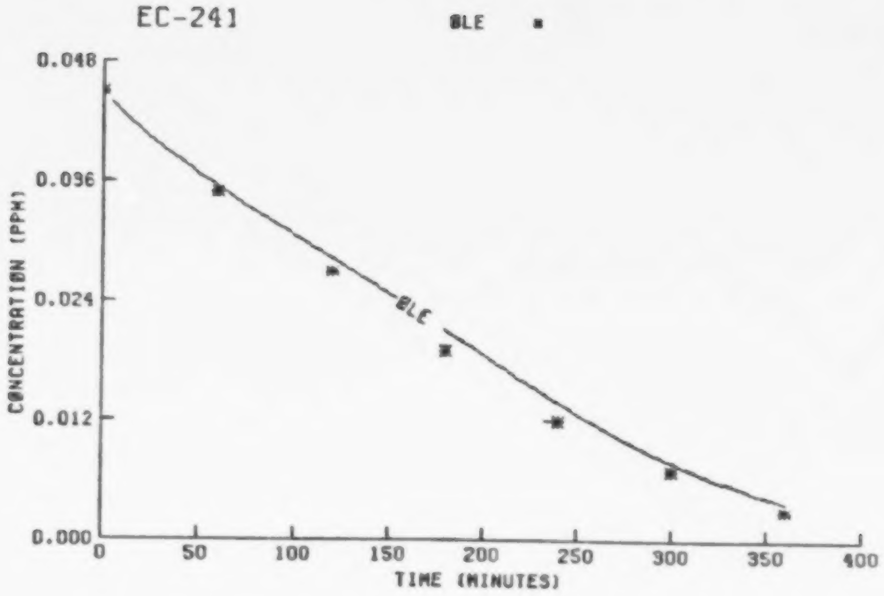


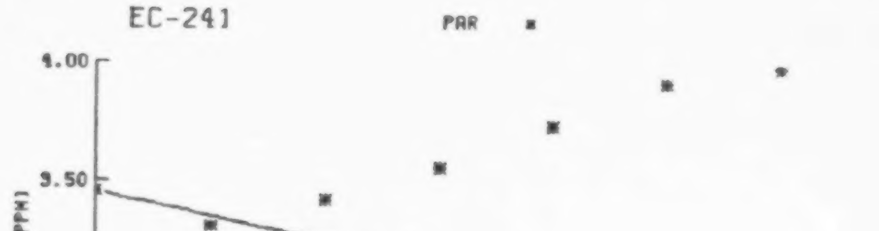
EC-238
ETH *
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
ETH
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

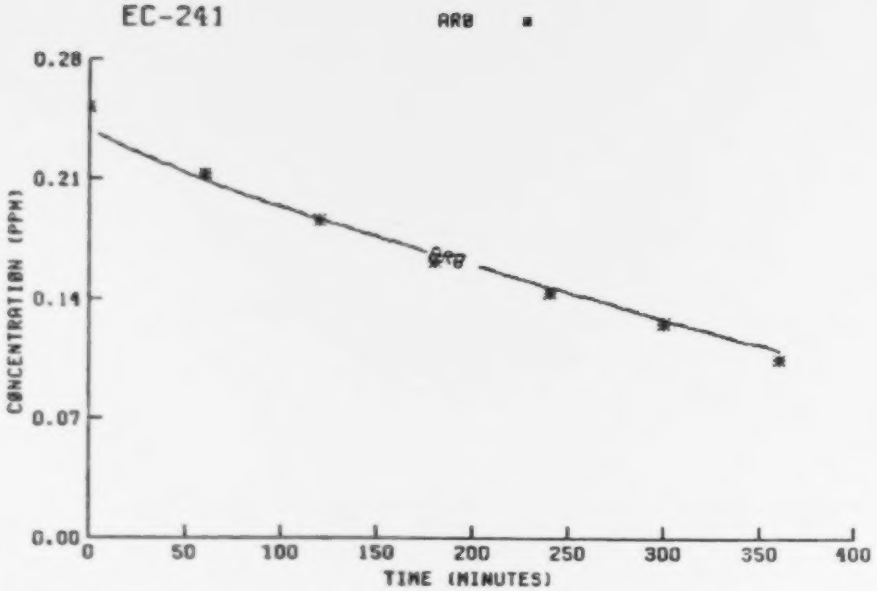

EC-238
HCHO *
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
HCHO
0
70
140
210
280
350
420
490
560
TIME (MINUTES)

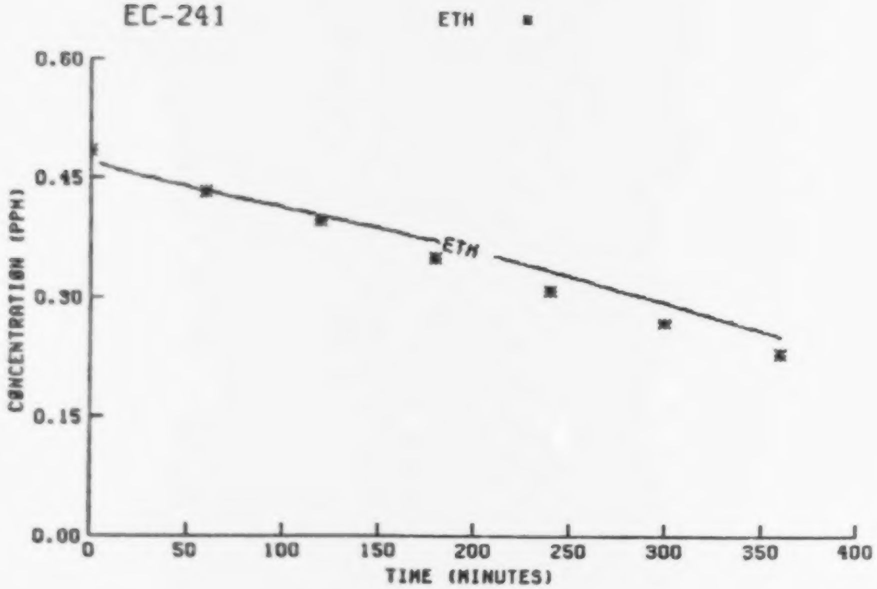

EC-241
NØ2 ×
NØ +
Ø3 ■
0.60
0.45
0.30
0.15
0.00
CØNCENTRATIØN (PPM)
NØ2
Ø3
NØ
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

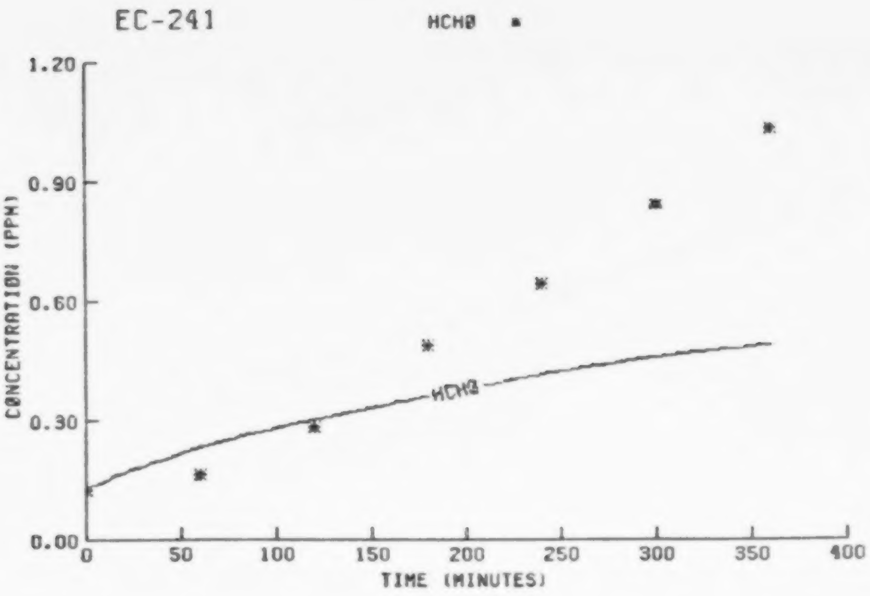

EC-241
PAN ■
0.060
0.045
0.030
0.015
0.000
CØNCENTRATIØN (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

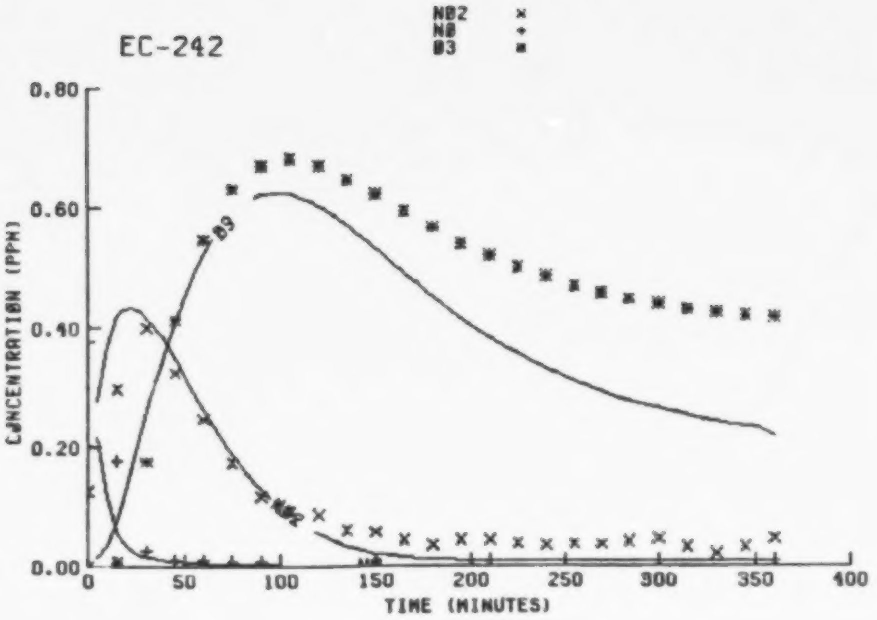

EC-241
OLE
0.048
0.036
0.024
0.012
0.000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
OLE

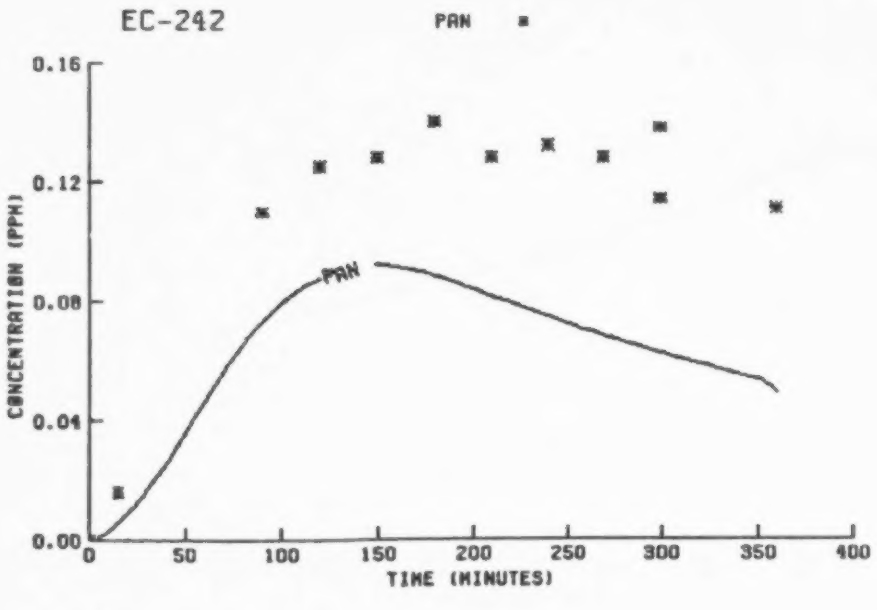

EC-241
PAR
4.00
3.50
3.00
2.50
2.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAR

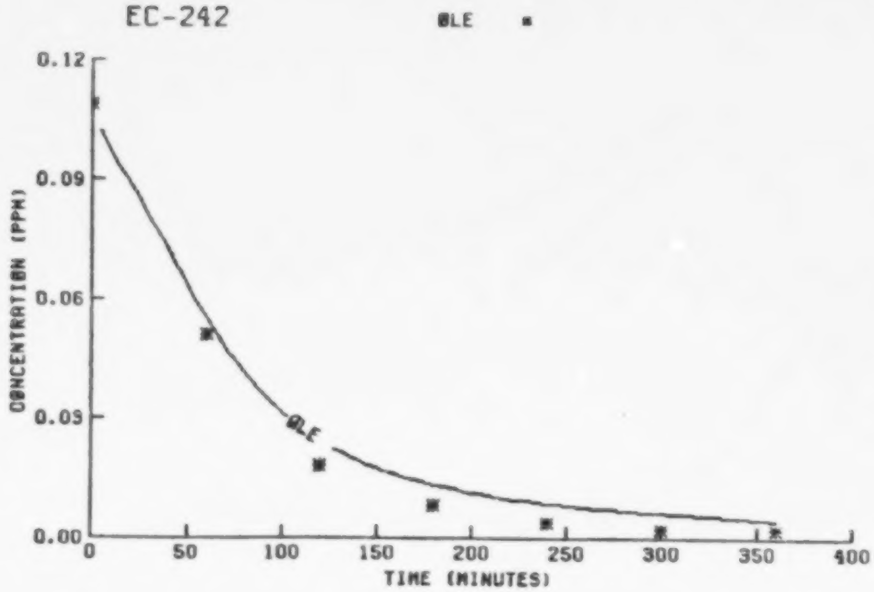

EC-241
ARØ
0.28
0.21
0.14
0.07
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ARØ

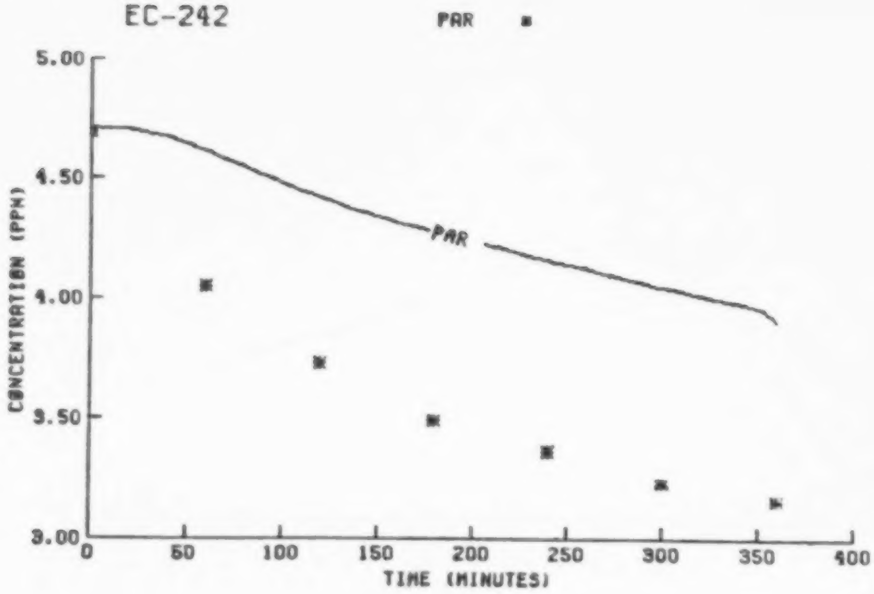

EC-241
ETH
0.60
0.45
0.30
0.15
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

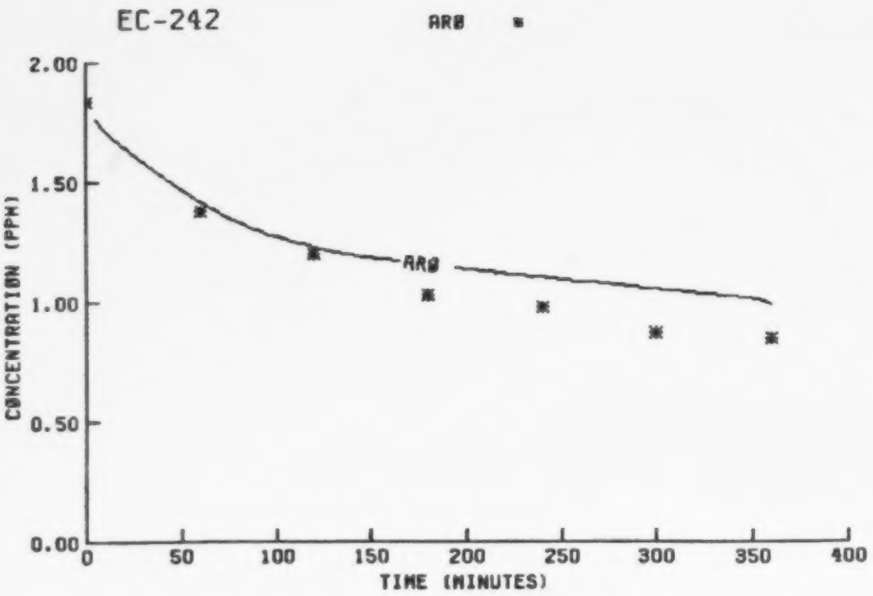

EC-241
HCHO *
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
HCHO

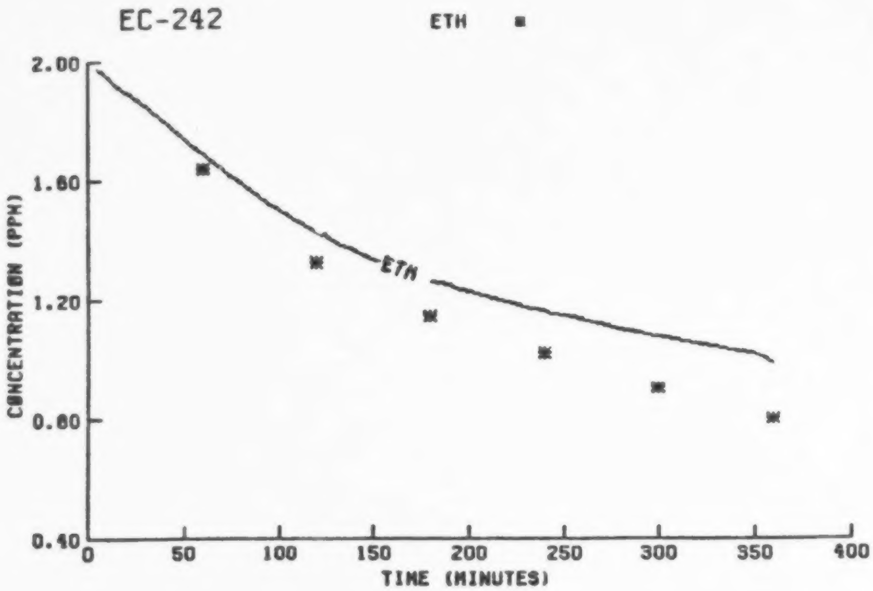

EC-242
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
O3
NO2
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

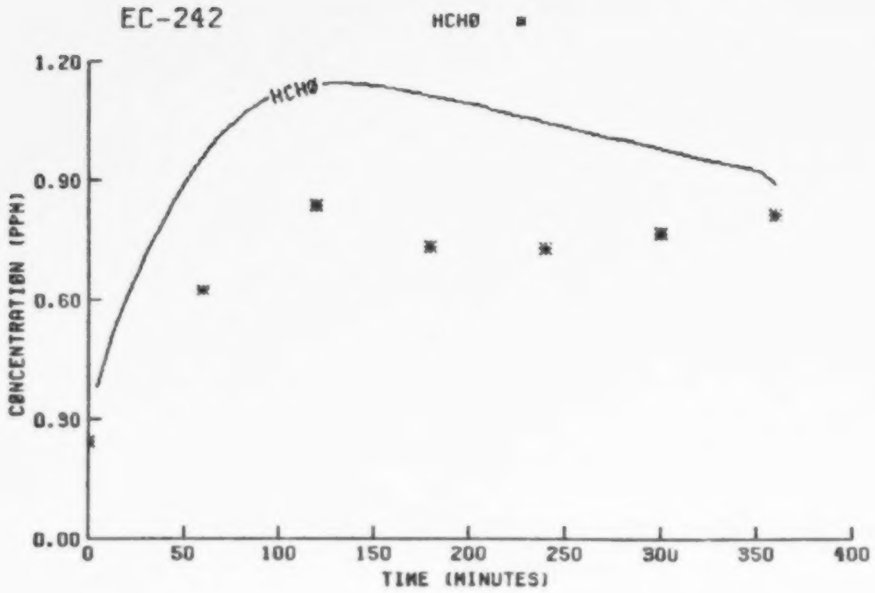

EC-242
PAN ✱
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
PAN
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

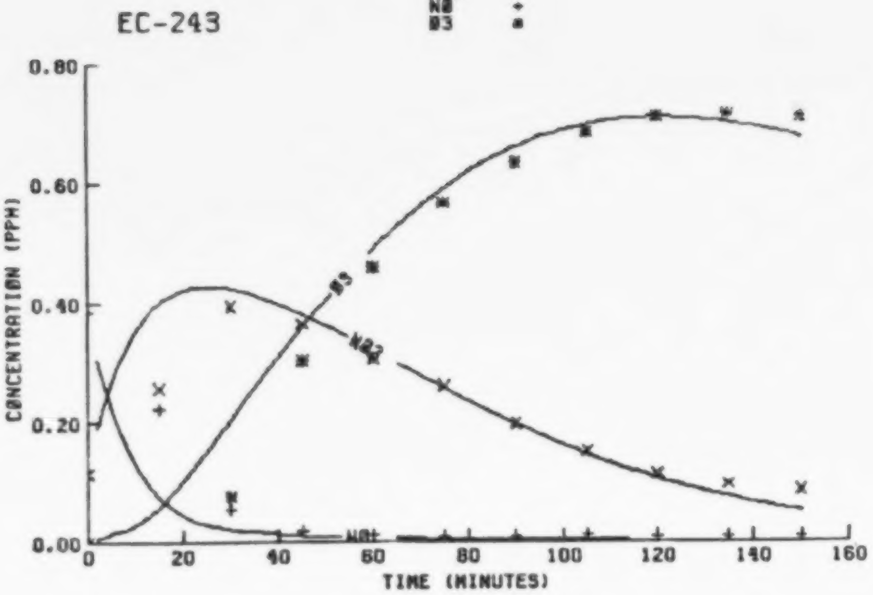

EC-242
OLE *
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
OLE
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

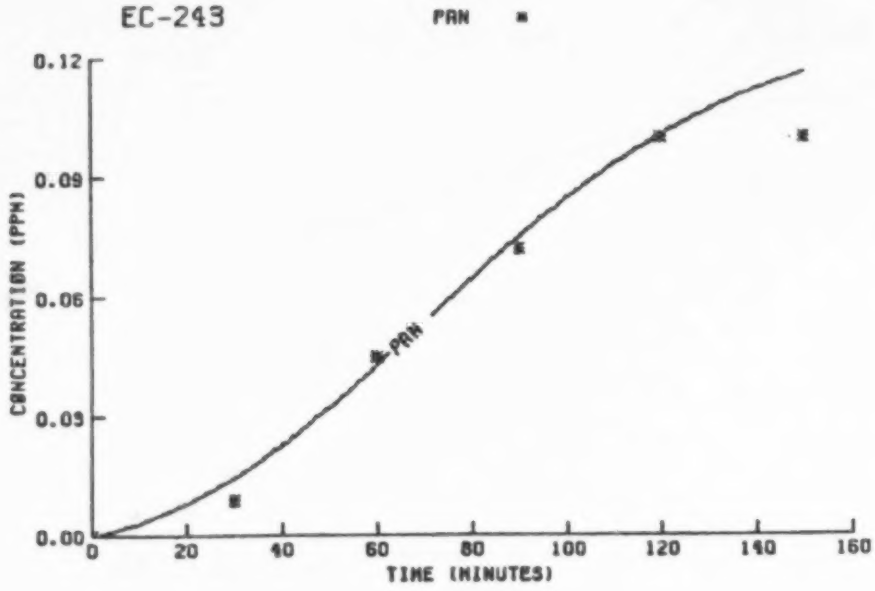

EC-242
PAR *
5.00
4.50
4.00
3.50
3.00
CONCENTRATION (PPM)
PAR
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

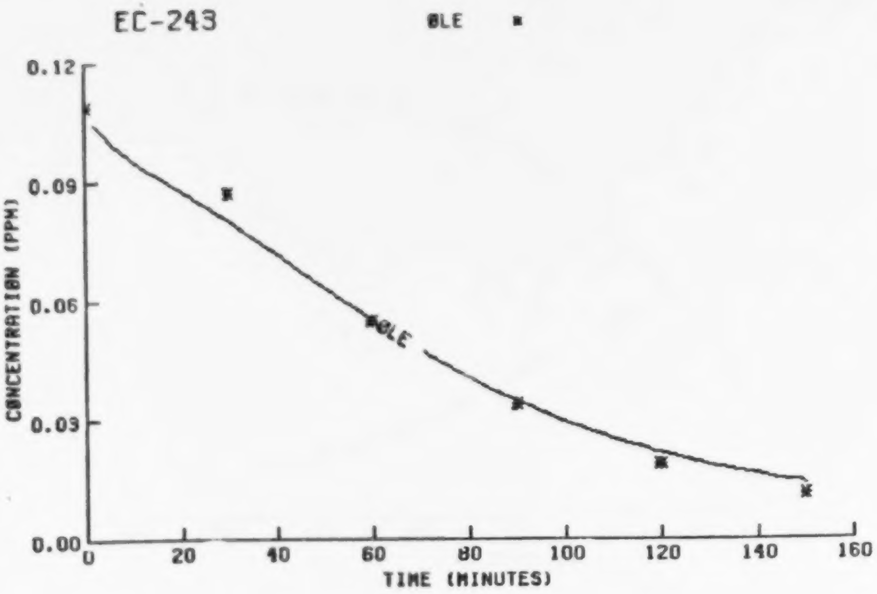

EC-242
ARØ *
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
ARØ
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

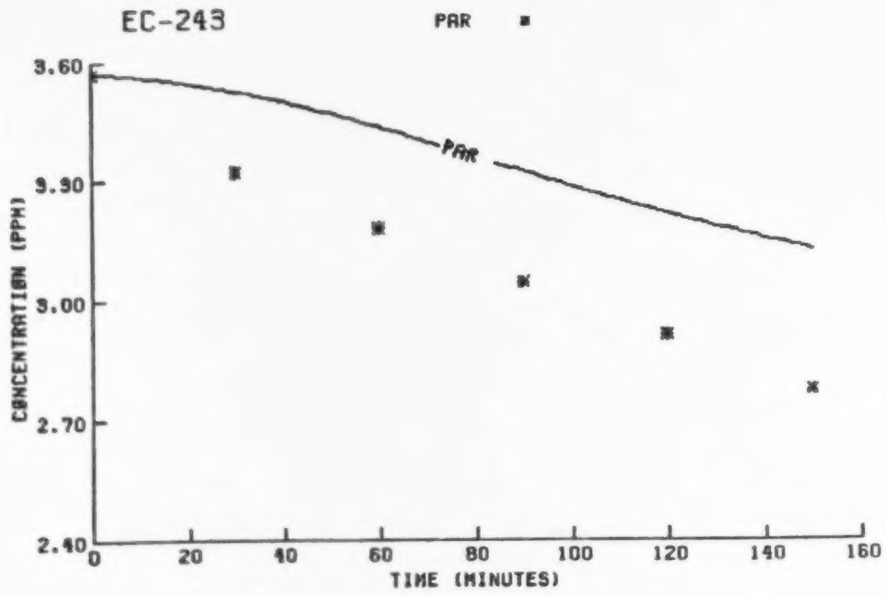

EC-242
ETH *
2.00
1.60
1.20
0.80
0.40
CONCENTRATION (PPM)
ETH
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

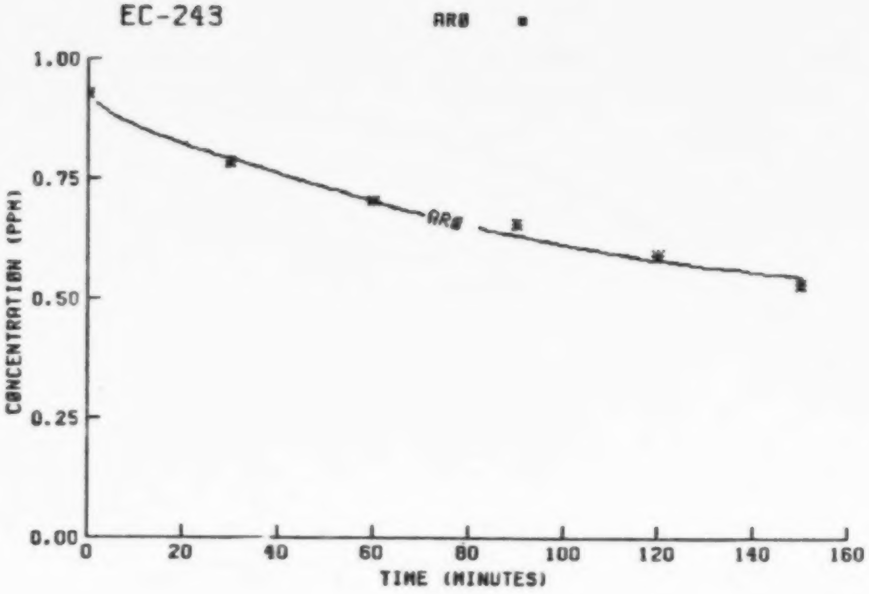

EC-242
HCHO *
HCHO
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

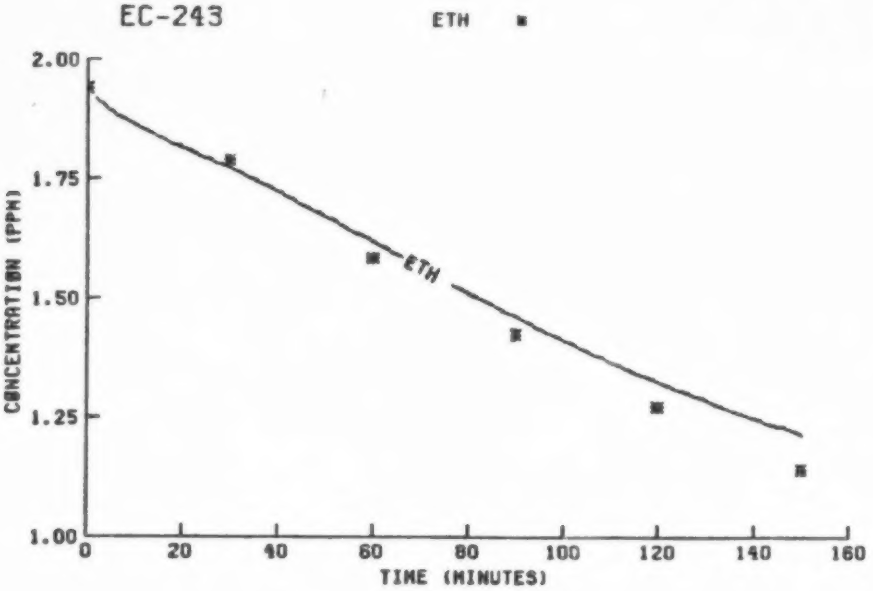

EC-243
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
20
40
60
80
100
120
140
160
TIME (MINUTES)
O3
NO2
NO

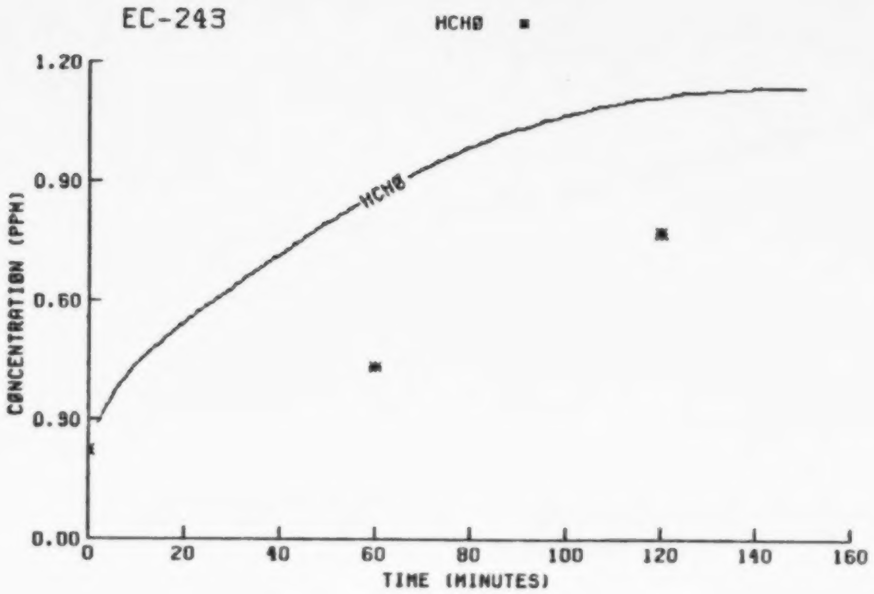

EC-243
PAN ✱
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
0
20
40
60
80
100
120
140
160
TIME (MINUTES)
PAN

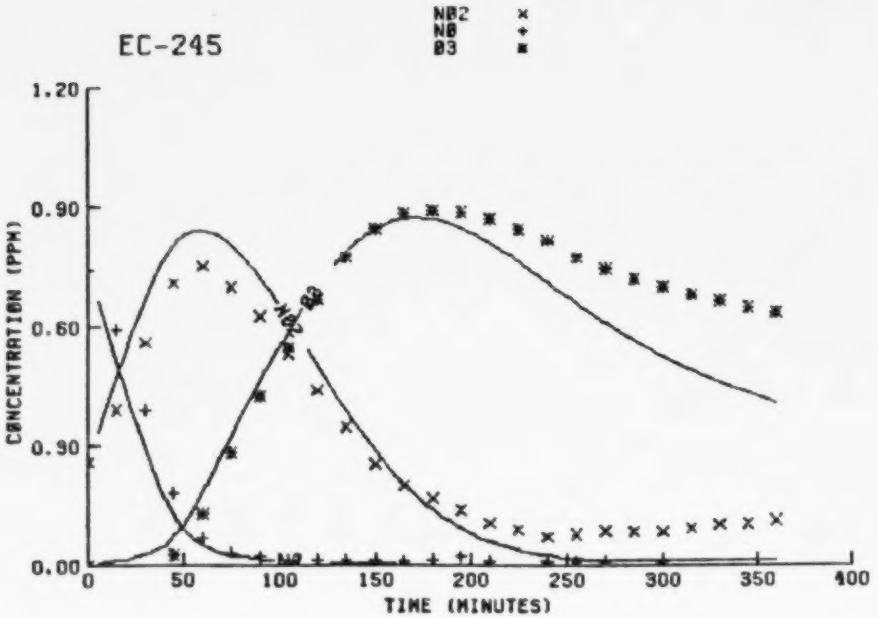

EC-243
OLE *
0.12
0.09
0.06
0.03
0.00
CONCENTRATION (PPM)
OLE
0
20
40
60
80
100
120
140
160
TIME (MINUTES)

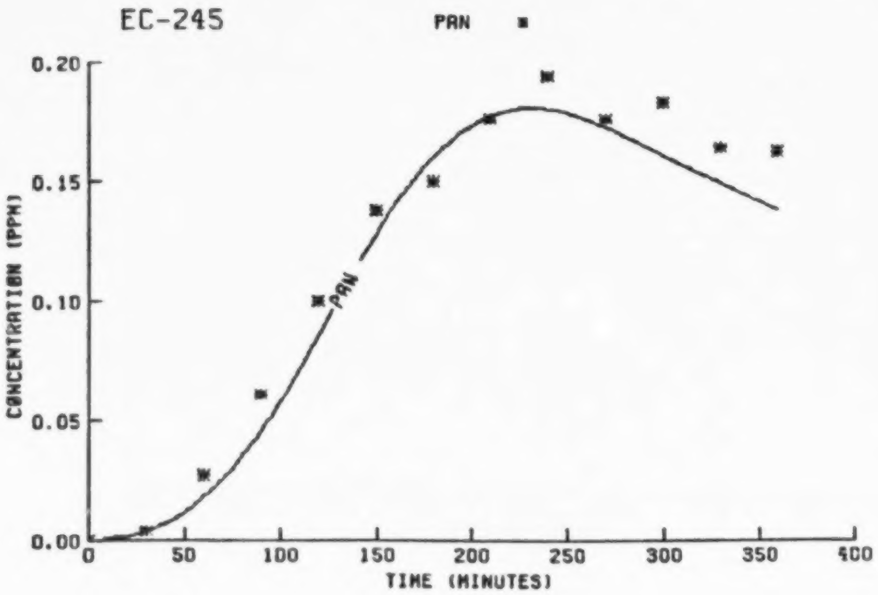

EC-243
PAR *
3.60
3.30
3.00
2.70
2.40
CONCENTRATION (PPM)
PAR
0
20
40
60
80
100
120
140
160
TIME (MINUTES)

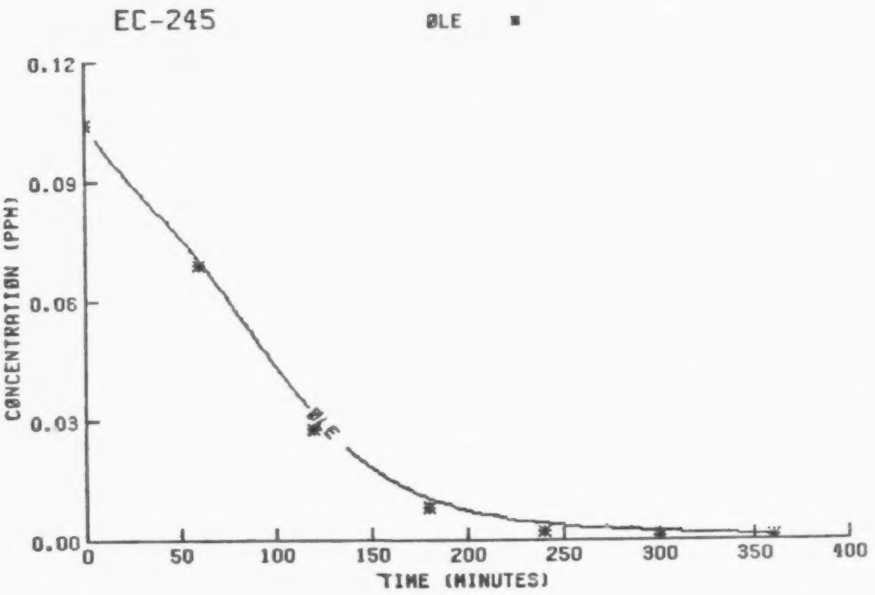

EC-243
ARØ ■
1.00
0.75
0.50
0.25
0.00
CØNCENTRATIØN (PPM)
ARØ
0
20
40
60
80
100
120
140
160
TIME (MINUTES)

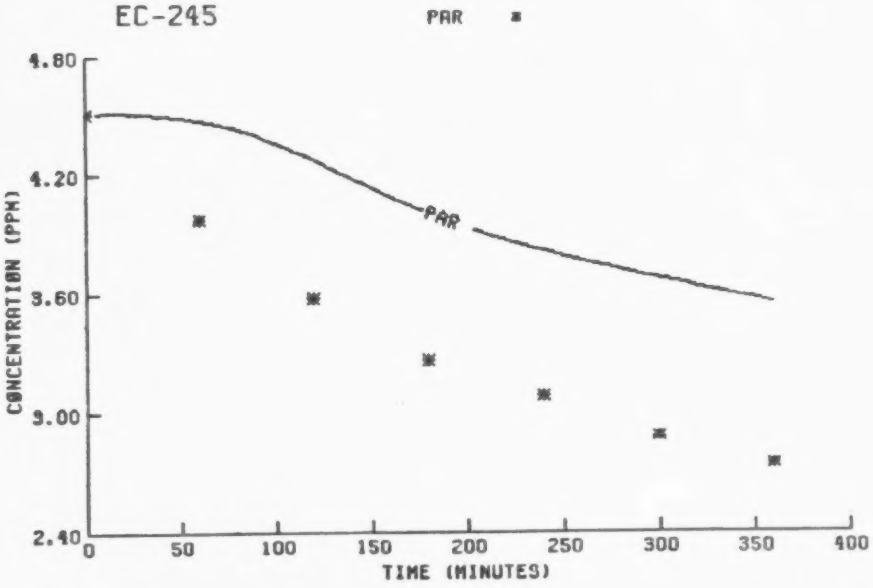

EC-243
ETH ■
2.00
1.75
1.50
1.25
1.00
CØNCENTRATIØN (PPM)
ETH
0
20
40
60
80
100
120
140
160
TIME (MINUTES)

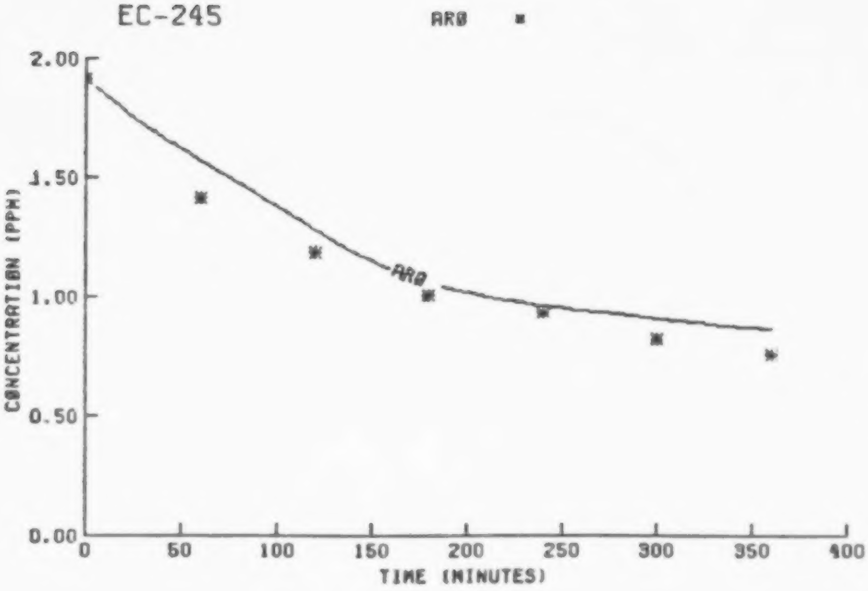

EC-243
HCHO
HCHO
CONCENTRATION (PPM)
1.20
0.90
0.60
0.30
0.00
0
20
40
60
80
100
120
140
160
TIME (MINUTES)

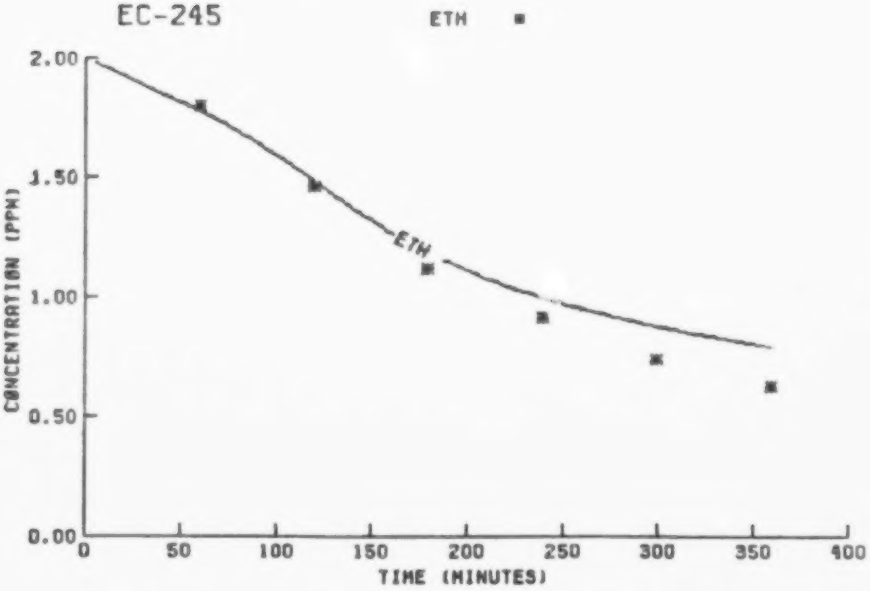

EC-245
NO2 ×
NO +
O3 ✱
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
O3
NO

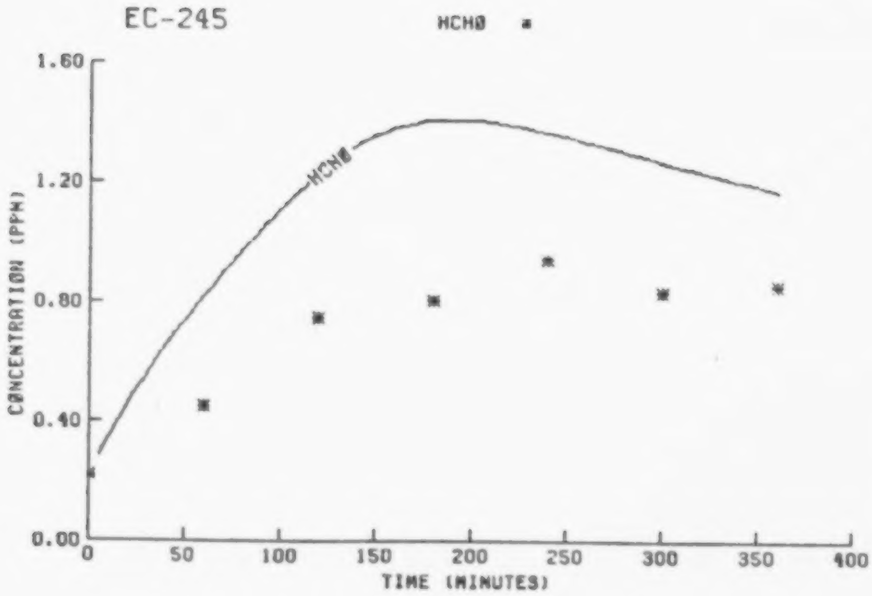

EC-245
PAN ✱
0.20
0.15
0.10
0.05
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

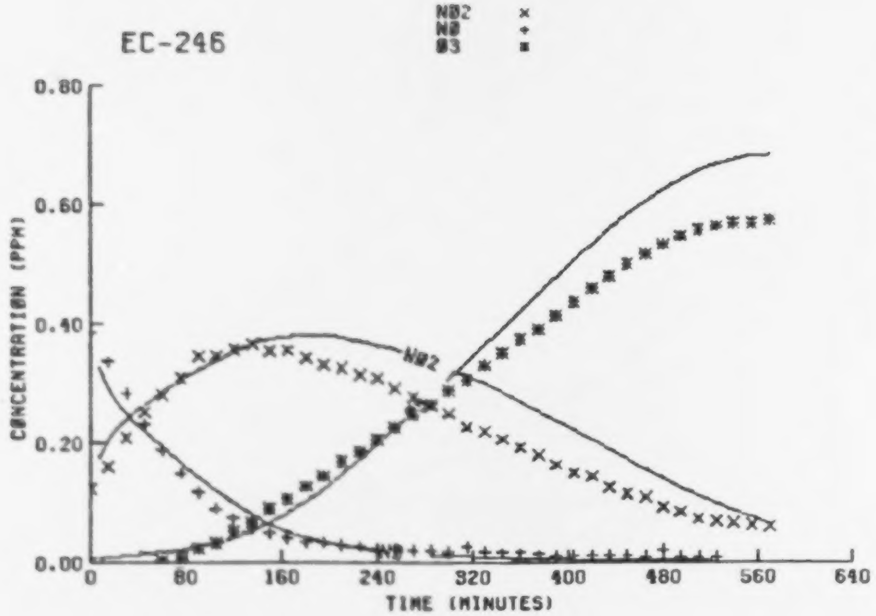

EC-245
OLE *
CONCENTRATION (PPM)
0.12
0.09
0.06
0.03
0.00
OLE
0
50
100
150
200
250
300
350
400
TIME (MINUTES)


EC-245
PAR *
CONCENTRATION (PPM)
4.80
4.20
3.60
3.00
2.40
PAR
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

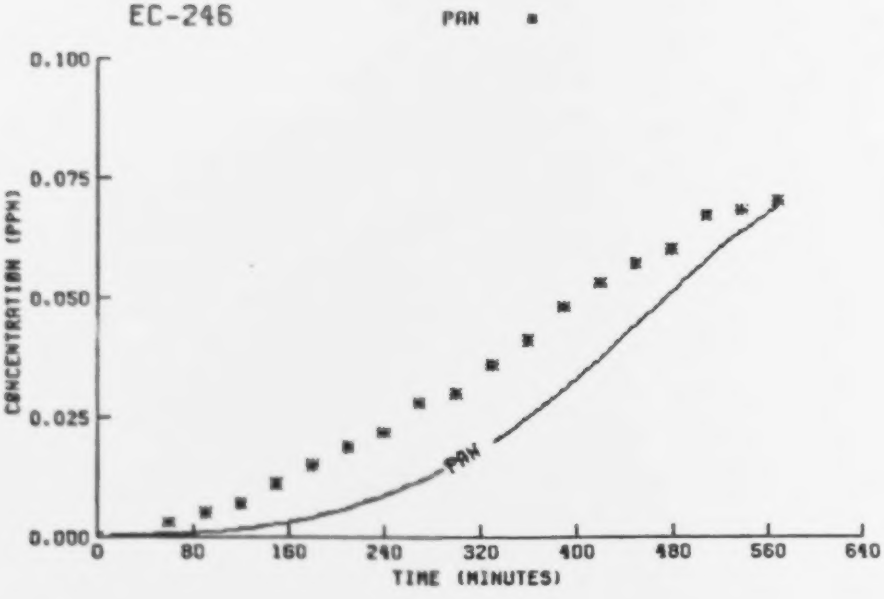

EC-245
ARØ *
2.00
1.50
1.00
0.50
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ARØ


EC-245
ETH *
2.00
1.50
1.00
0.50
0.00
CØNCENTRATIØN (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
ETH

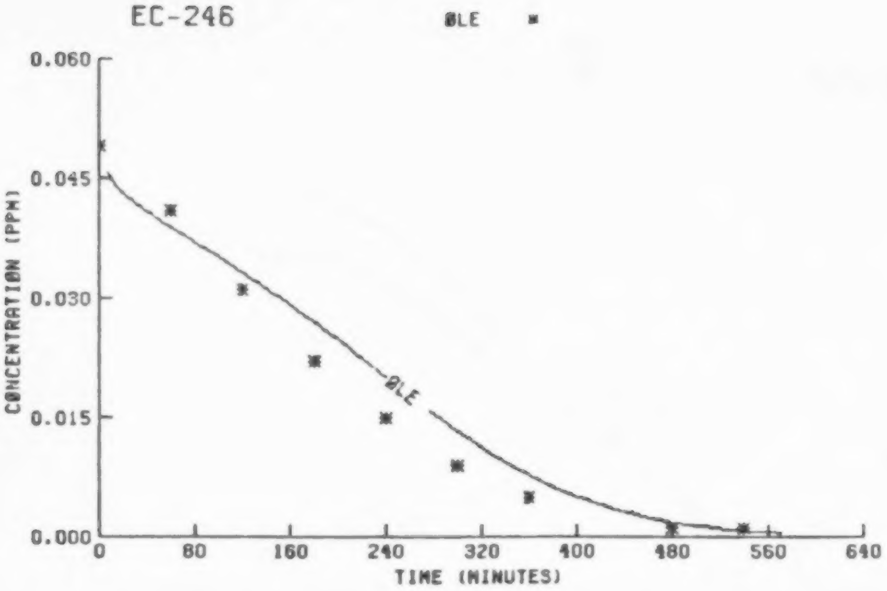

EC-245
HCHO *
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
HCHO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

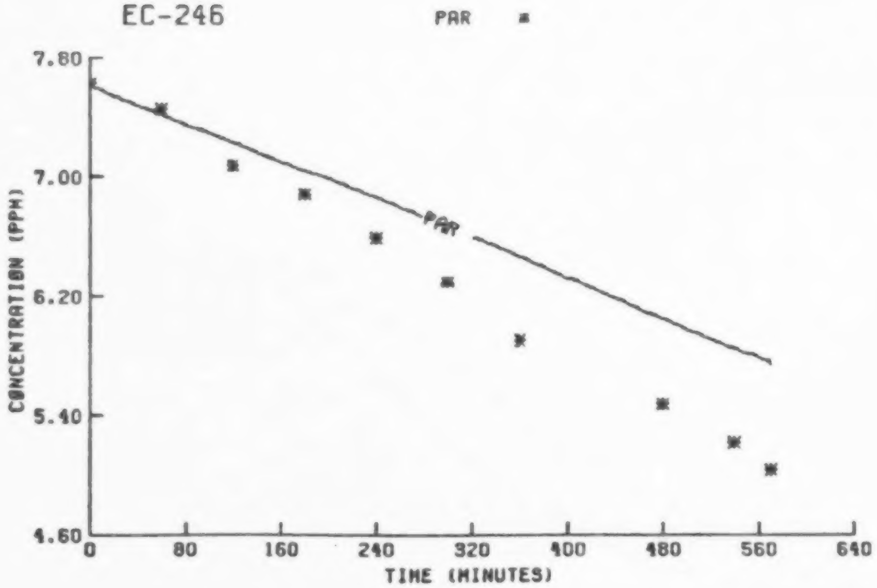


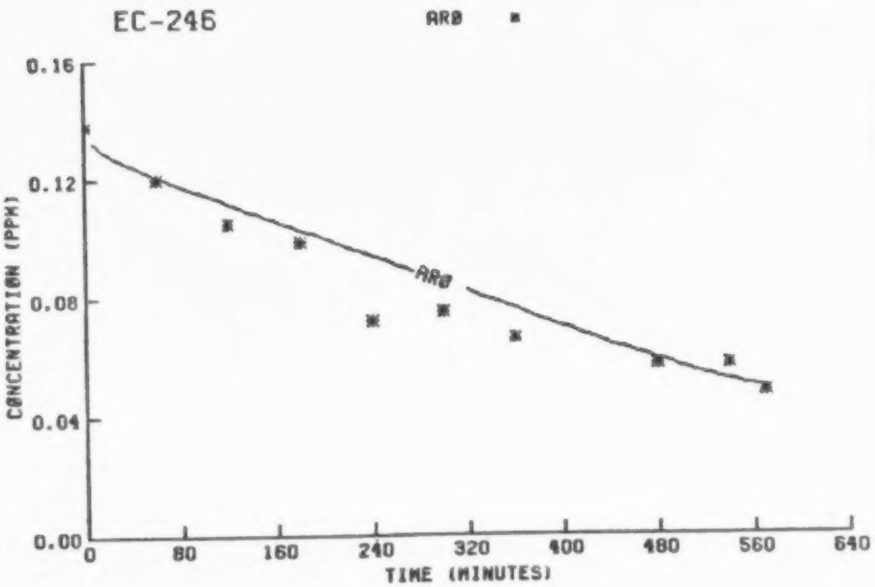
EC-246
NØ2 ×
NØ +
Ø3 ✱
CØNCENTRATIØN (PPM)
0.00
0.20
0.40
0.60
0.80
TIME (MINUTES)
0
80
160
240
320
400
480
560
640
NØ2
NØ

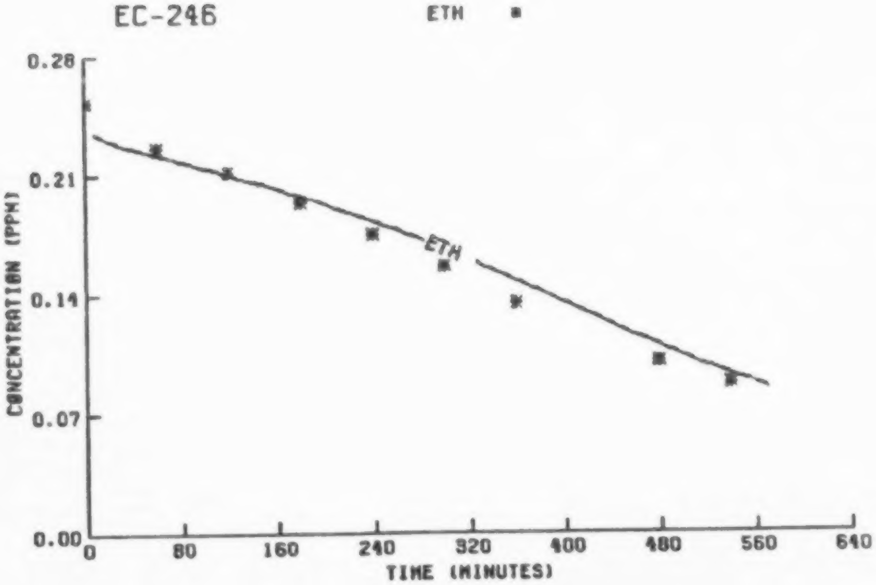


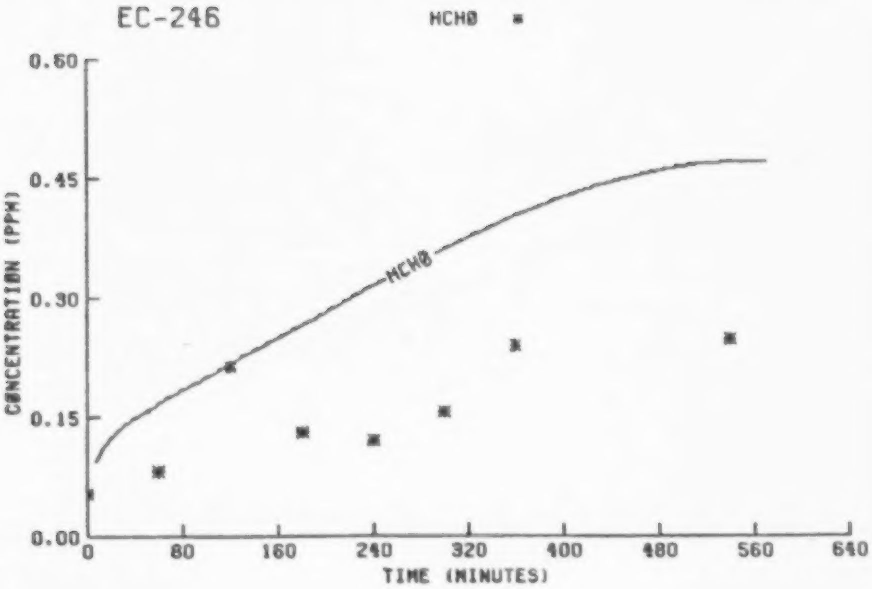
EC-246
PAN ✱
CØNCENTRATIØN (PPM)
0.000
0.025
0.050
0.075
0.100
TIME (MINUTES)
0
80
160
240
320
400
480
560
640
PAN

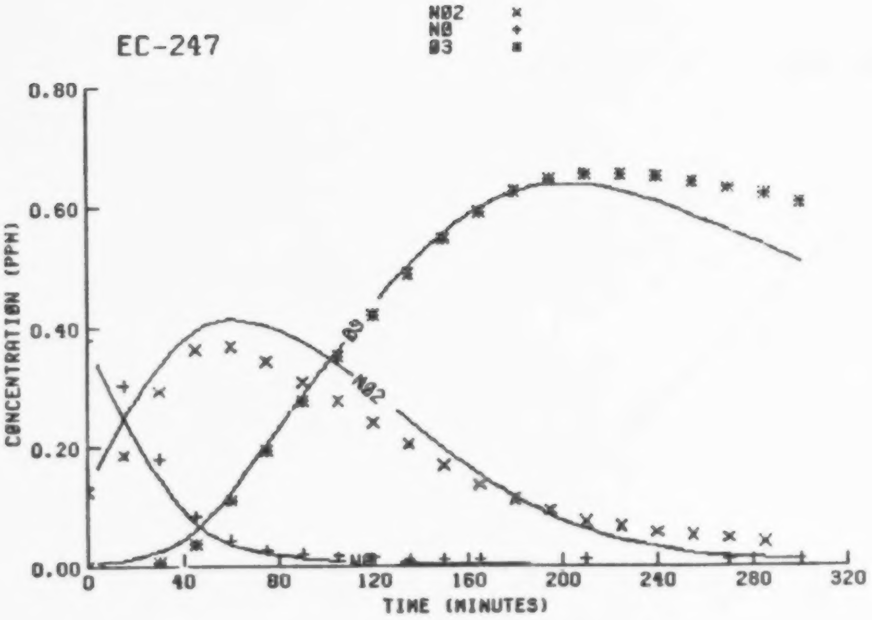

EC-246
ØLE *
0.060
0.045
0.030
0.015
0.000
CONCENTRATIØN (PPM)
ØLE
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

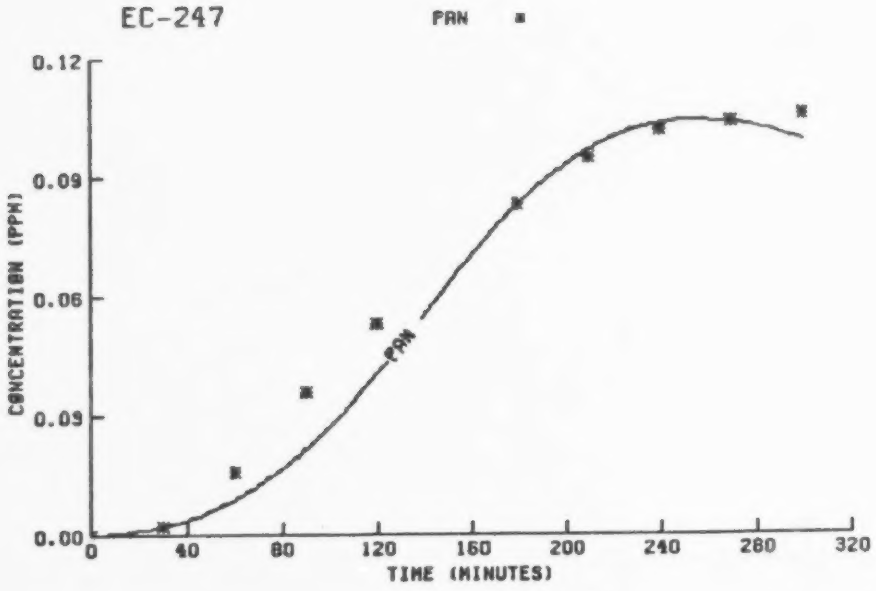

EC-246
PAR *
7.80
7.00
6.20
5.40
4.60
CONCENTRATIØN (PPM)
PAR
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

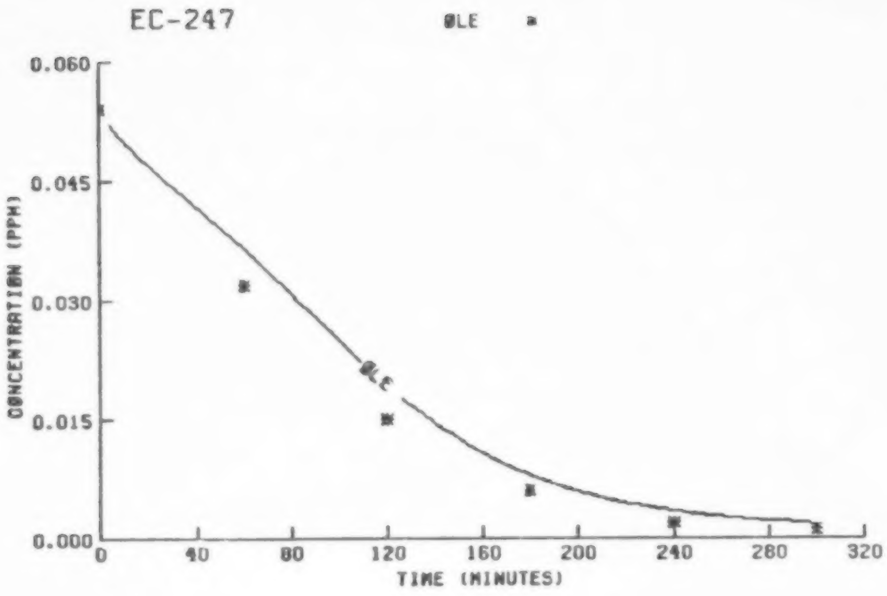

EC-246
ARØ *
ARØ
CØNCENTRATIØN (PPM)
0.16
0.12
0.08
0.04
0.00
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

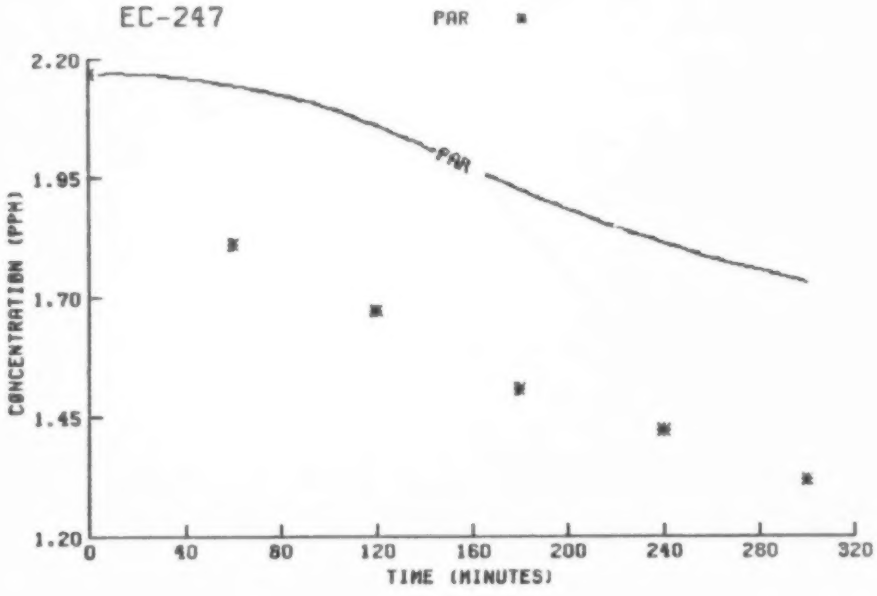

EC-246
ETH *
ETH
CØNCENTRATIØN (PPM)
0.28
0.21
0.14
0.07
0.00
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

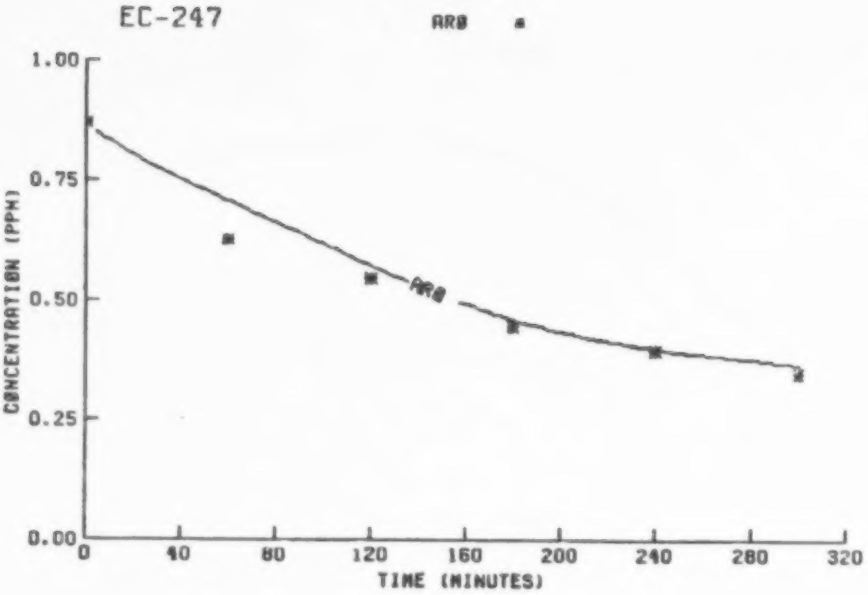

EC-246
HCHO *
0.60
0.45
0.30
0.15
0.00
CONCENTRATION (PPM)
HCHO
0
80
160
240
320
400
480
560
640
TIME (MINUTES)

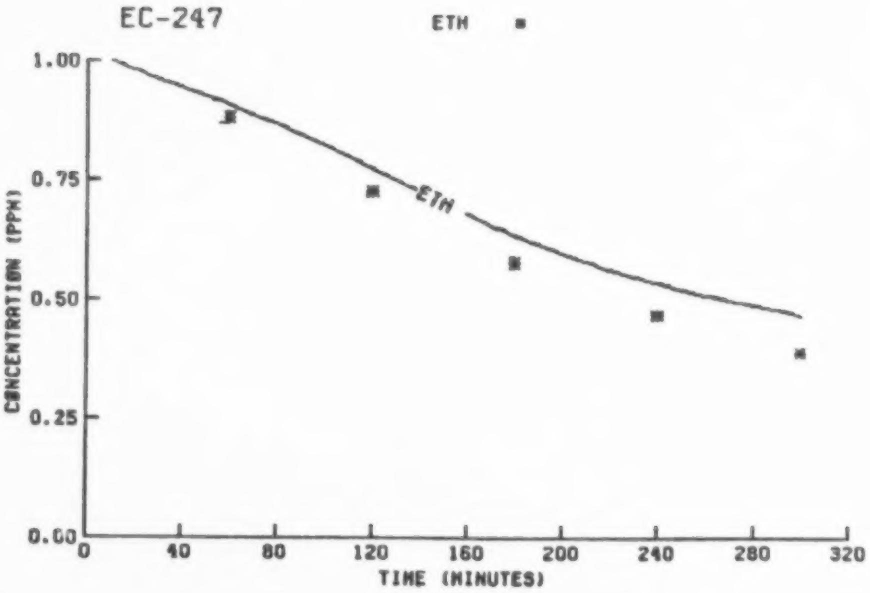

EC-247
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.80
0.60
0.40
0.20
0.00
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
O3
NO2
NO

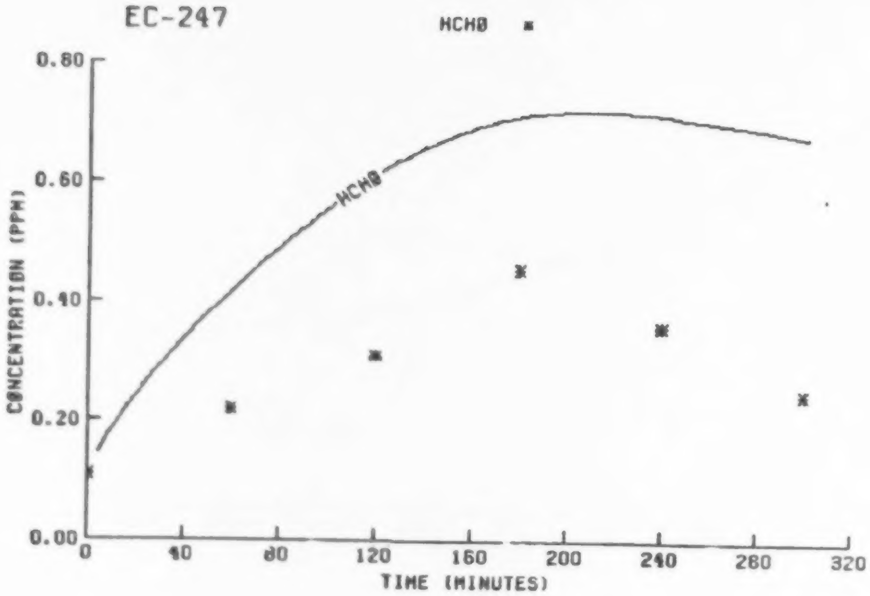

EC-247
PAN ✱
CONCENTRATION (PPM)
0.12
0.09
0.06
0.03
0.00
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
PAN


EC-247
OLE *
0.060
0.045
0.030
0.015
0.000
CONCENTRATION (PPM)
OLE
0
40
80
120
160
200
240
280
320
TIME (MINUTES)


EC-247
PAR *
2.20
1.95
1.70
1.45
1.20
CONCENTRATION (PPM)
PAR
0
40
80
120
160
200
240
280
320
TIME (MINUTES)


EC-247
ARO ■
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
ARO
0
40
80
120
160
200
240
280
320
TIME (MINUTES)

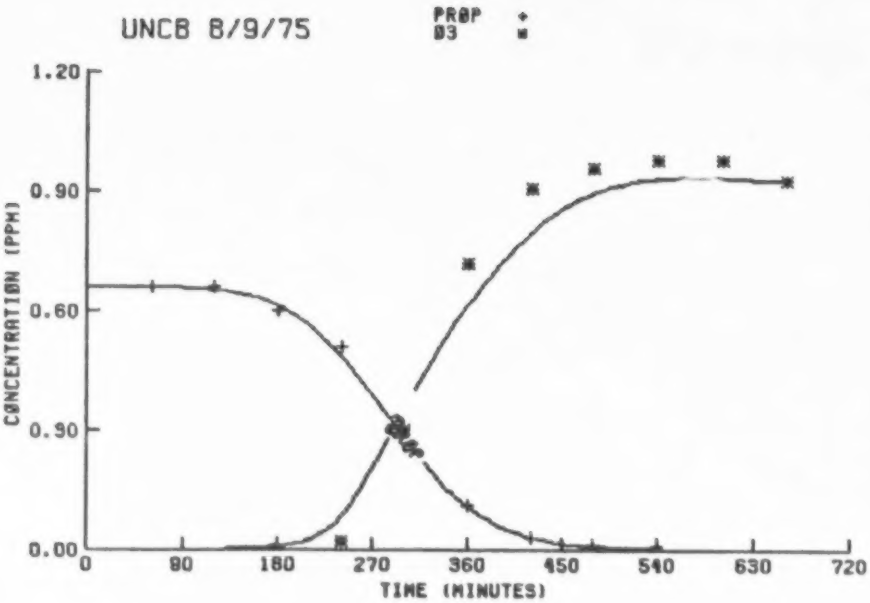

EC-247
ETH ■
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
ETH
0
40
80
120
160
200
240
280
320
TIME (MINUTES)

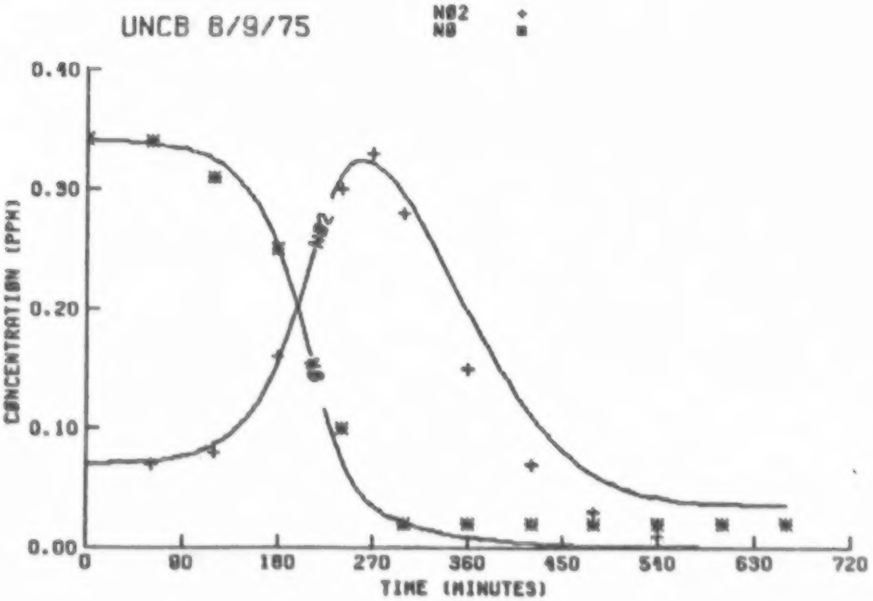

EC-247
HCHO ✱
HCHO
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
40
80
120
160
200
240
280
320
TIME (MINUTES)

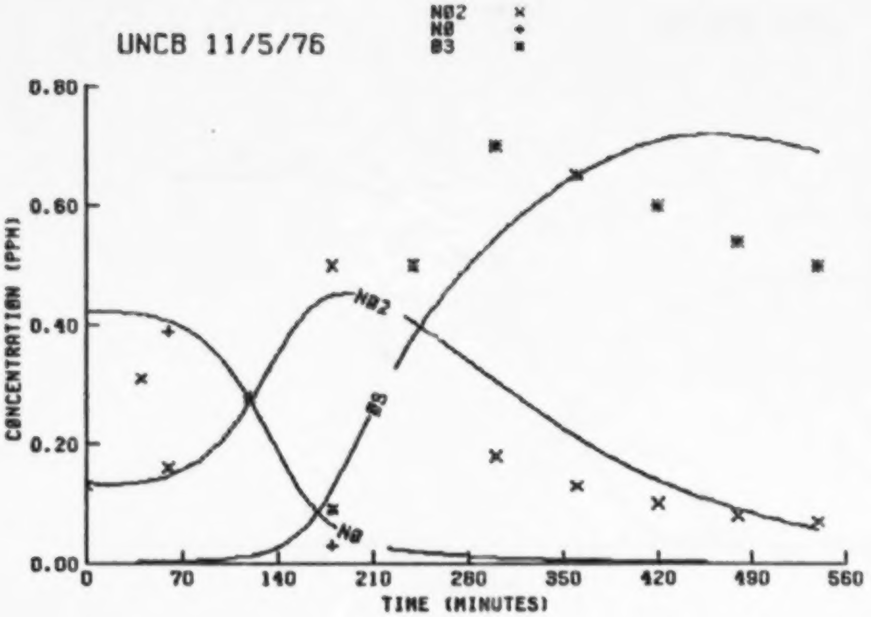
Part C

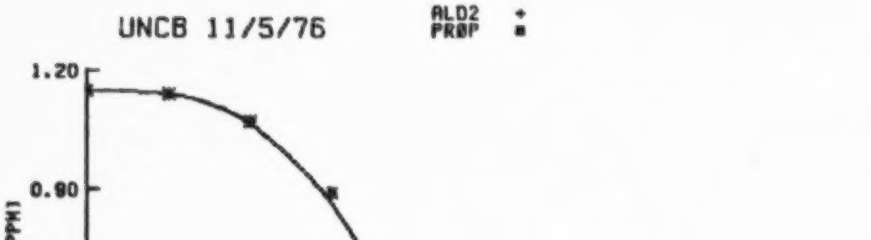
Simulation Results of Propylene Experiments Performed at Various Chambers

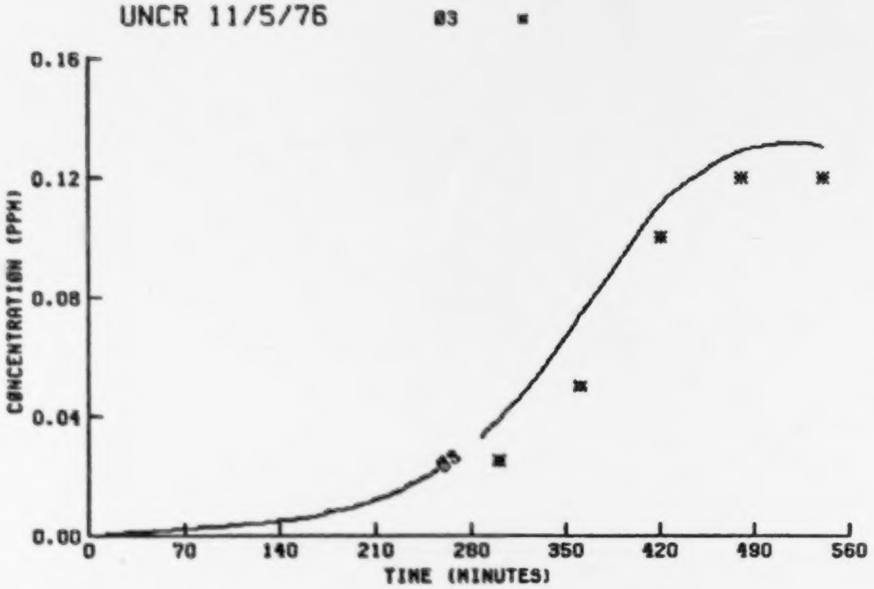
UNC CHAMBER EXPERIMENTS

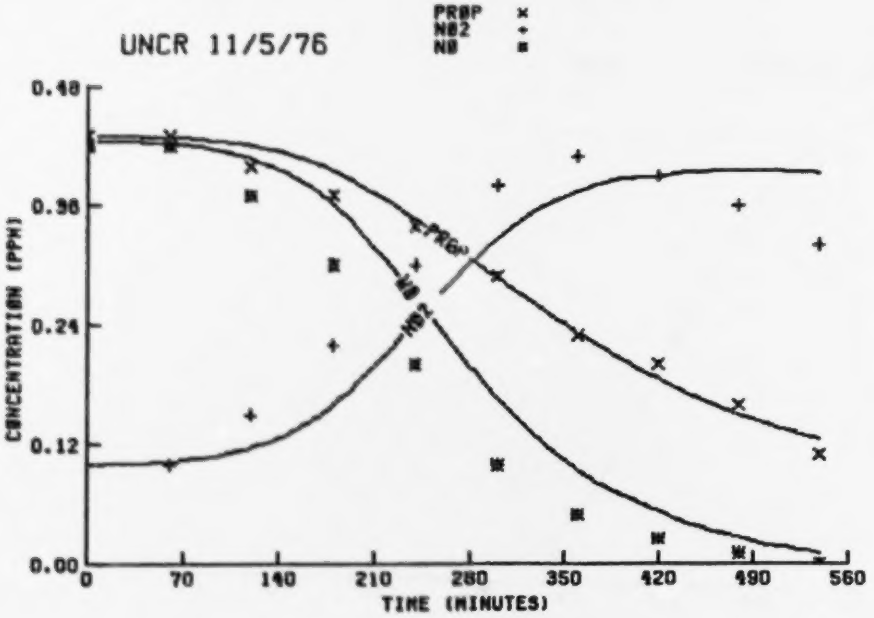

UNCB 8/9/75
PROP +
O3 *
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
O3
PROP

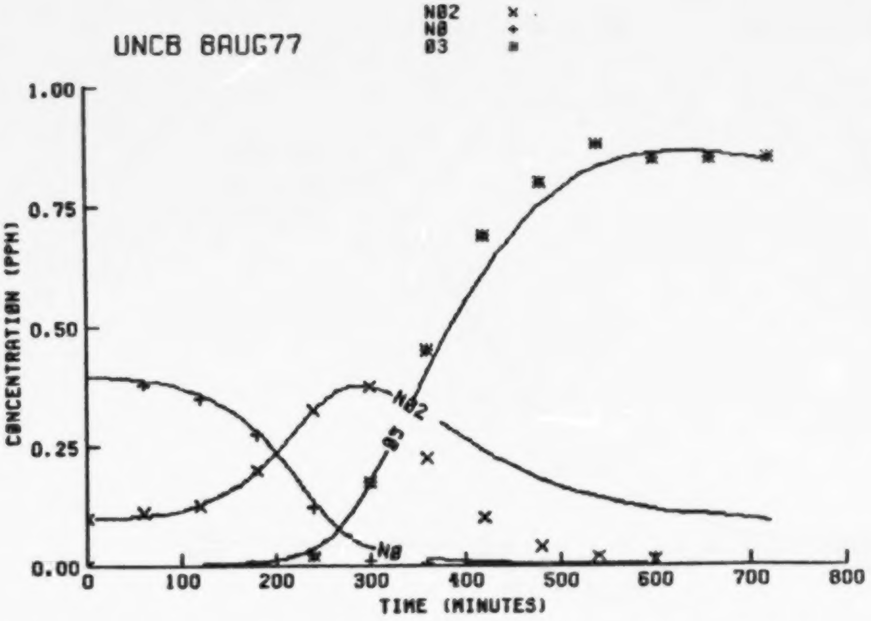

UNCB 8/9/75
NO2 +
NO *
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
90
180
270
360
450
540
630
720
TIME (MINUTES)
NO2
NO

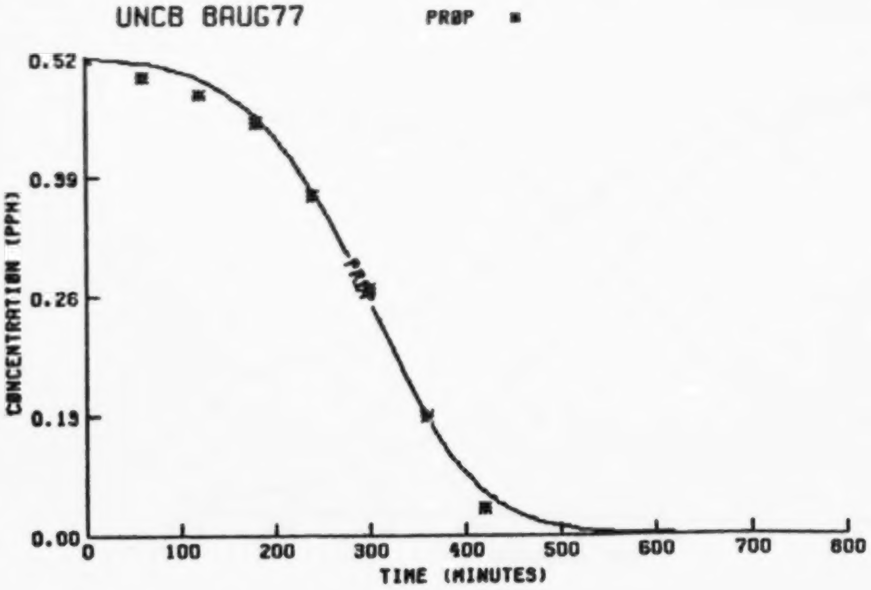

UNCB 11/5/76
NØ2 ×
NØ +
Ø3 ∗
0.80
0.60
0.40
0.20
0.00
CØNCENTRATIØN (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
NØ2
Ø3
NØ

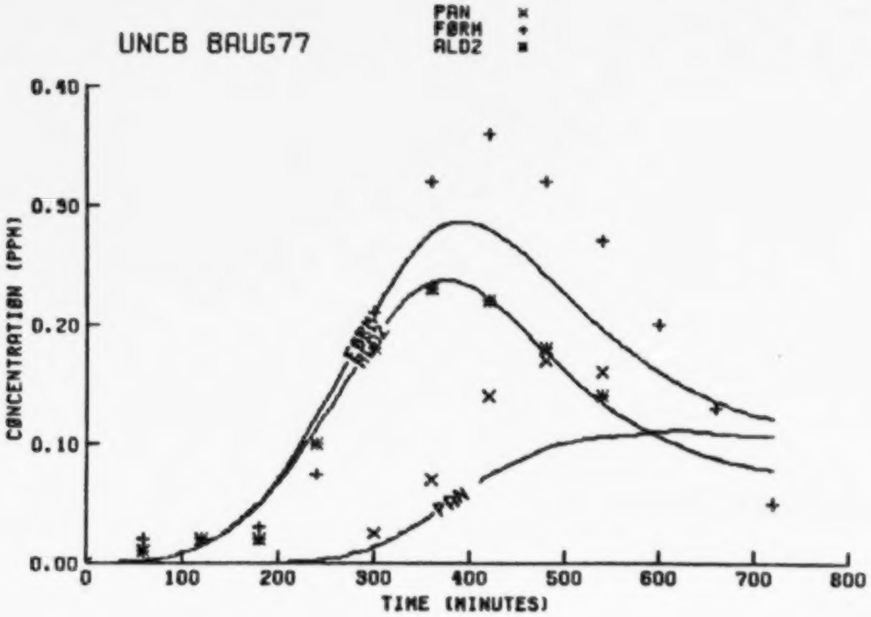

UNCB 11/5/76
ALD2 +
PRØP ∗
1.20
0.90
0.60
0.30
0.00
CØNCENTRATIØN (PPM)
0
70
140
210
280
350
420
490
560
TIME (MINUTES)
PRØP
ALD2


UNCR 11/5/76
Ø3 ✱
Ø3
CØNCENTRATIØN (PPM)
0.00
0.04
0.08
0.12
0.16
TIME (MINUTES)
0
70
140
210
280
350
420
490
560

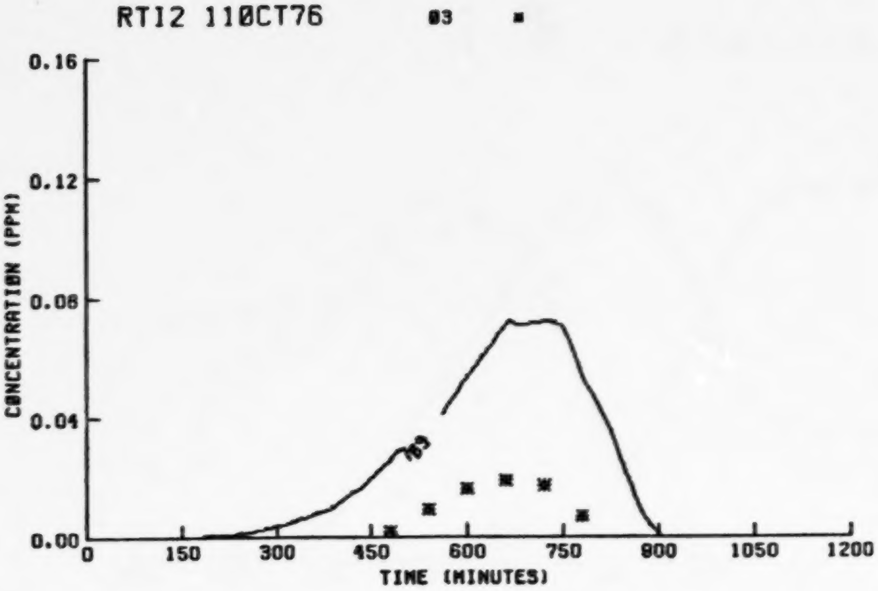

UNCR 11/5/76
PRØP ×
NØ2 +
NØ ✱
PRØP
NØ
NØ2
CØNCENTRATIØN (PPM)
0.00
0.12
0.24
0.36
0.48
TIME (MINUTES)
0
70
140
210
280
350
420
490
560

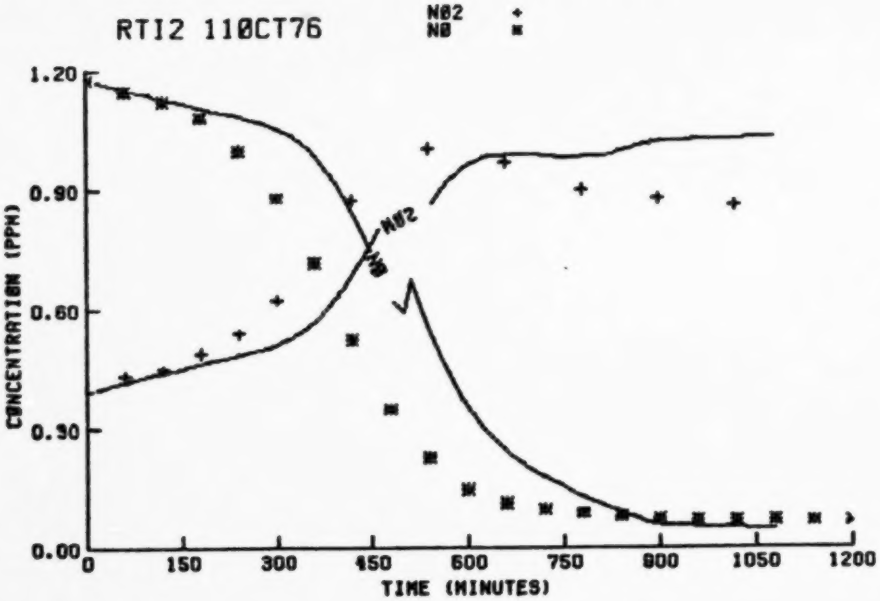

UNCB 8AUG77
NO2 ×
NO +
O3 *
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
100
200
300
400
500
600
700
800
TIME (MINUTES)
NO2
O3
NO

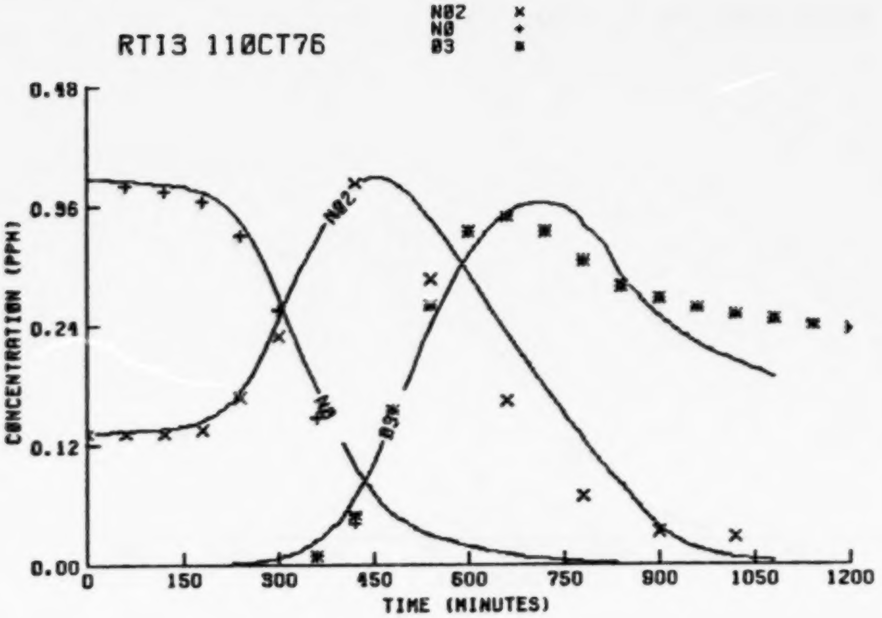

UNCB 8AUG77
PROP *
0.52
0.39
0.26
0.13
0.00
CONCENTRATION (PPM)
0
100
200
300
400
500
600
700
800
TIME (MINUTES)
PROP

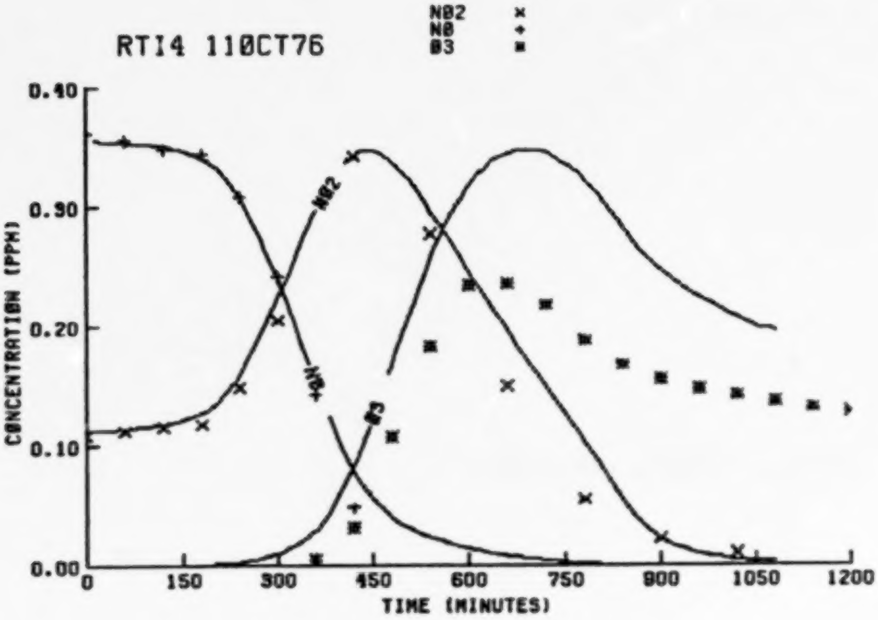

UNCB 8AUG77
PAN ×
FØRM +
ALD2 ✱
CØNCENTRATIØN (PPM)
0.40
0.30
0.20
0.10
0.00
TIME (MINUTES)
0
100
200
300
400
500
600
700
800
FØRM
ALD2
PAN

RTI CHAMBER EXPERIMENTS

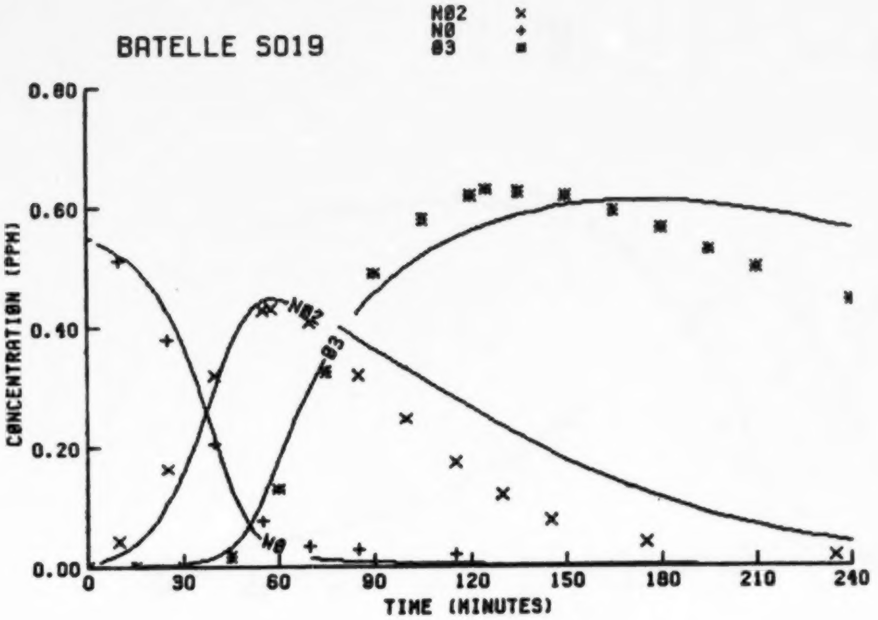

RTI2 11OCT76
O3 *
0.16
0.12
0.08
0.04
0.00
CONCENTRATION (PPM)
O3
0
150
300
450
600
750
900
1050
1200
TIME (MINUTES)


RTI2 11OCT76
NO2 +
NO *
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
NO2
NO
0
150
300
450
600
750
900
1050
1200
TIME (MINUTES)

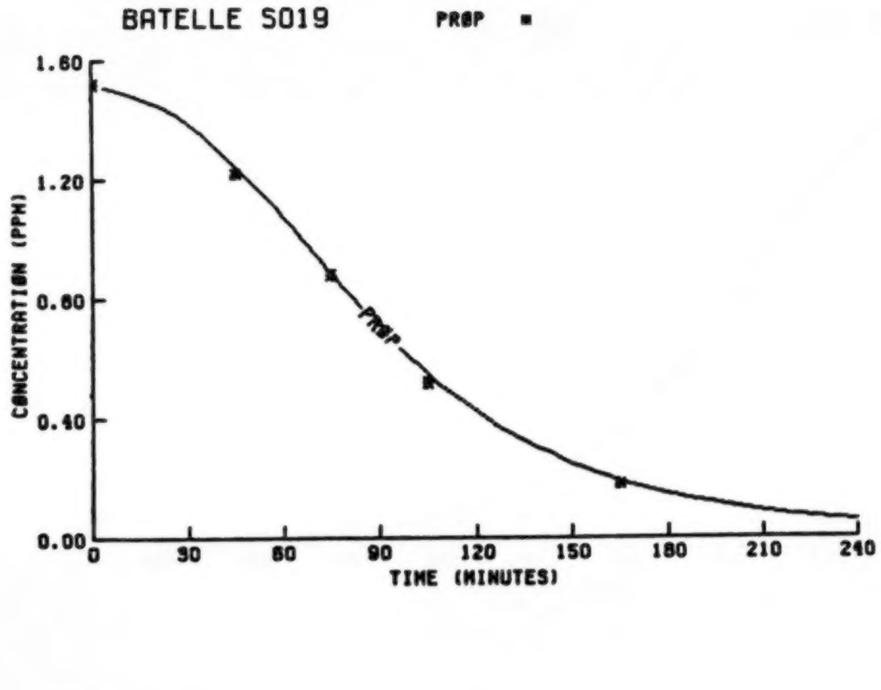

RTI3 11OCT76
NO2 ×
NO +
O3 ✱
0.48
0.36
0.24
0.12
0.00
CONCENTRATION (PPM)
0
150
300
450
600
750
900
1050
1200
TIME (MINUTES)
NO2
NO
O3


RTI4 11OCT76
NO2 ×
NO +
O3 ✱
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
150
300
450
600
750
900
1050
1200
TIME (MINUTES)
NO2
NO
O3

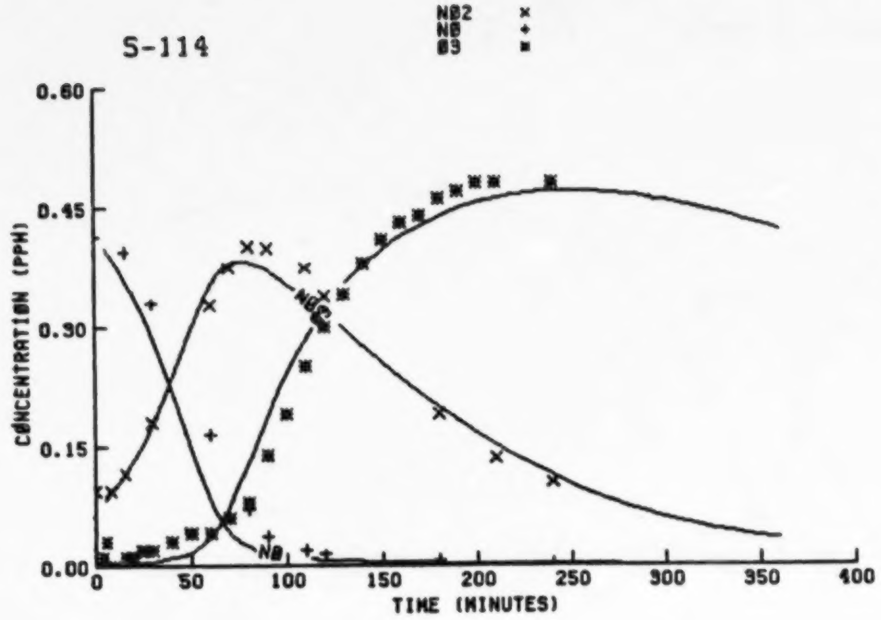
BATTELLE CHAMBER EXPERIMENTS

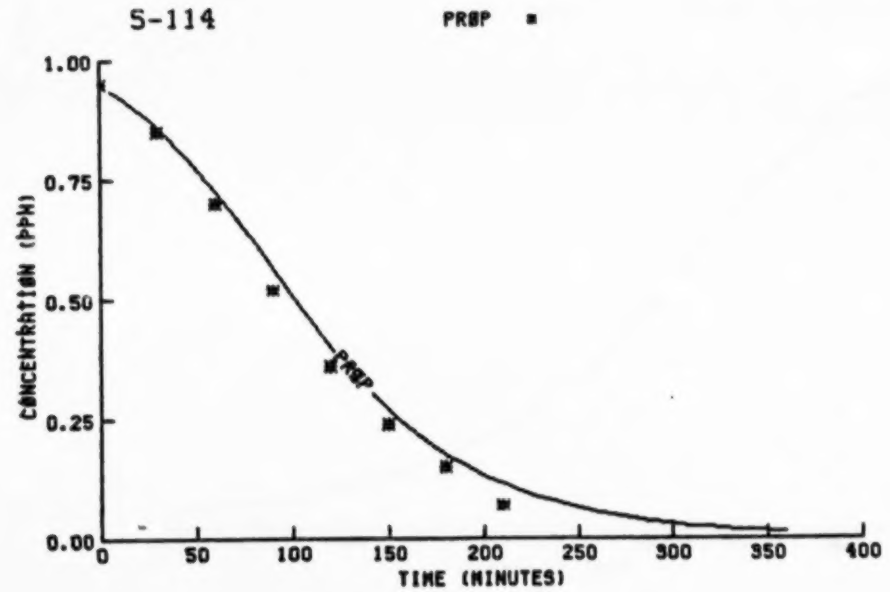


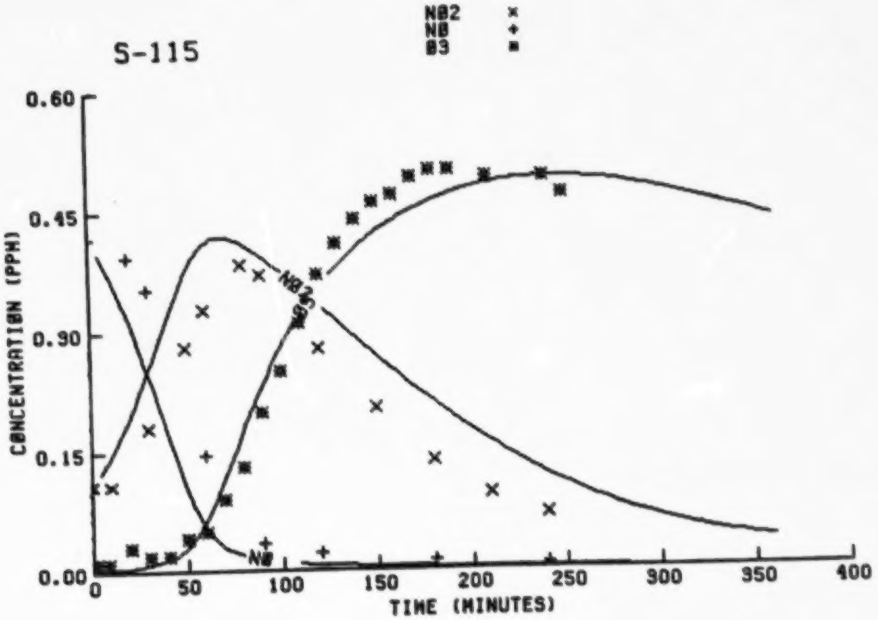
BATELLE S019
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
NO2
O3
NO
0
30
60
90
120
150
180
210
240
TIME (MINUTES)

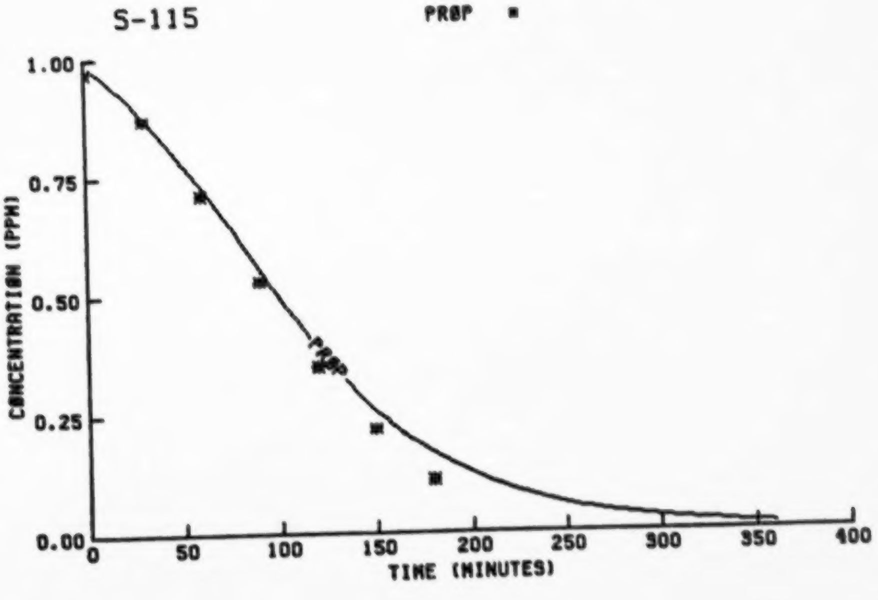


BATELLE S019
PROP ✱
1.60
1.20
0.80
0.40
0.00
CONCENTRATION (PPM)
PROP
0
30
60
90
120
150
180
210
240
TIME (MINUTES)

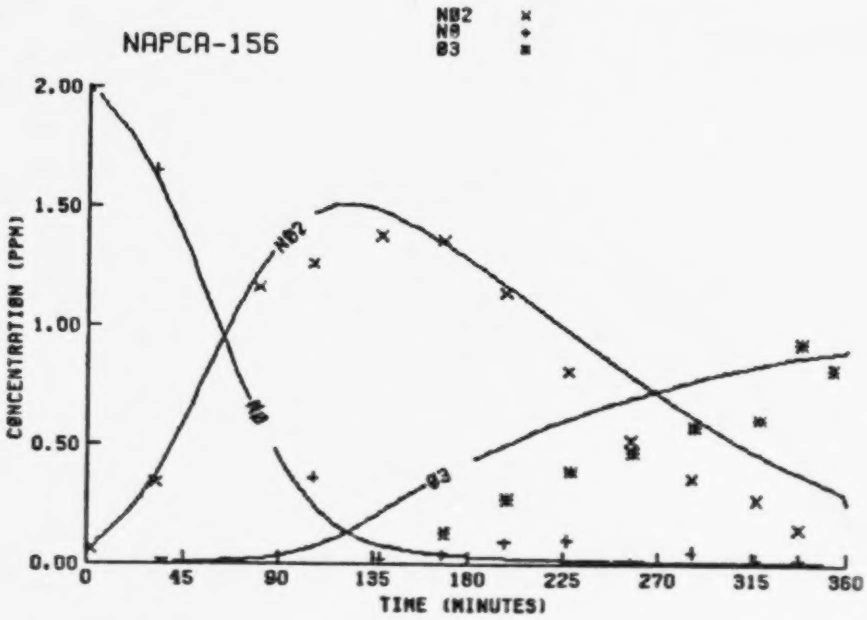

S-114
NØ2 ×
NØ +
Ø3 ✱
CØNCENTRATIØN (PPM)
0.60
0.45
0.30
0.15
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
NØ2
NØ

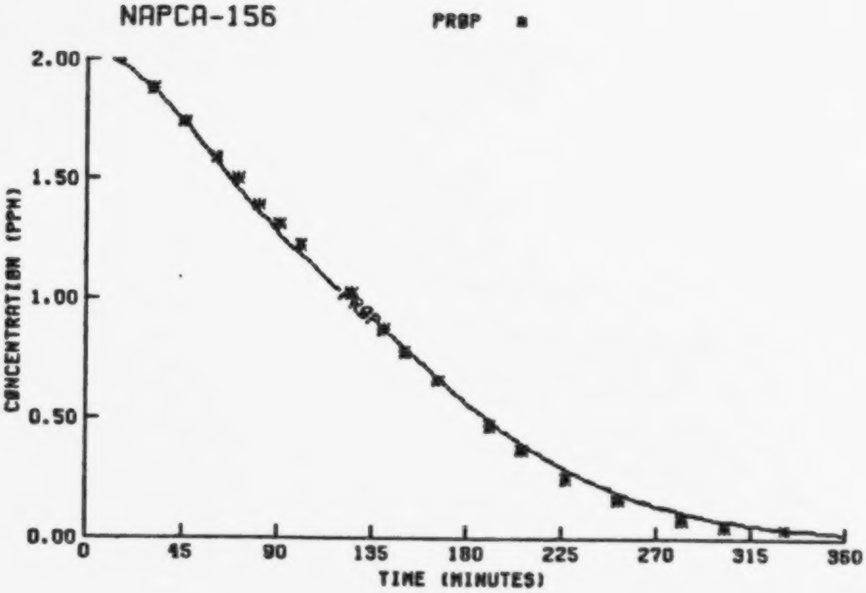

S-114
PRØP ✱
CØNCENTRATIØN (PPM)
1.00
0.75
0.50
0.25
0.00
TIME (MINUTES)
0
50
100
150
200
250
300
350
400
PRØP

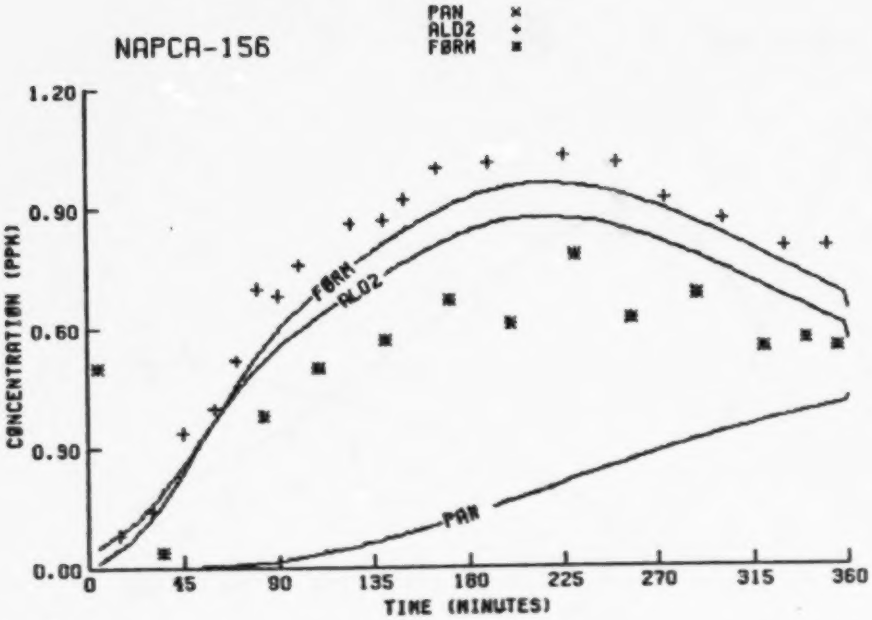

S-115
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.60
0.45
0.90
0.15
0.00
NO2
O3
NO
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

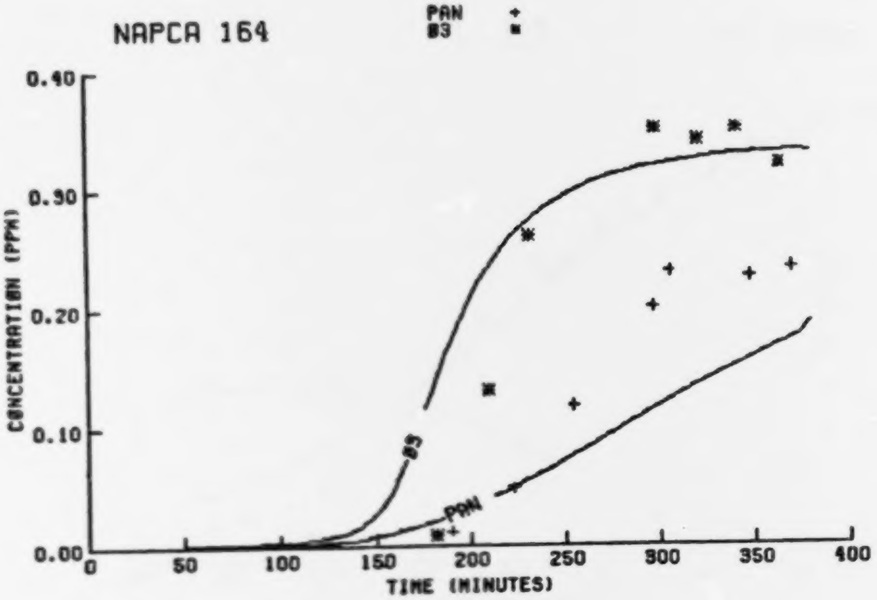

S-115
PROP ✱
CONCENTRATION (PPM)
1.00
0.75
0.50
0.25
0.00
PROP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

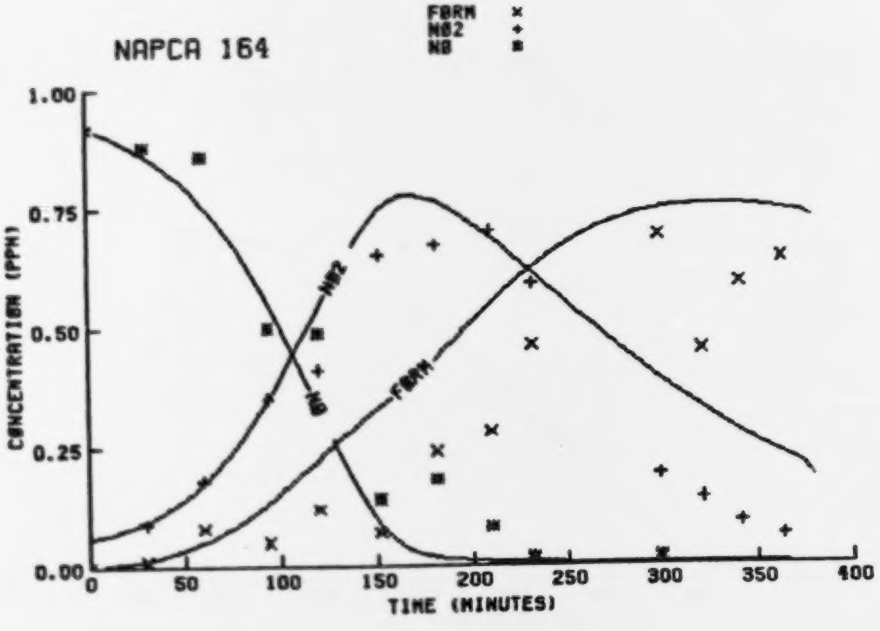
NAPCA CHAMBER EXPERIMENTS

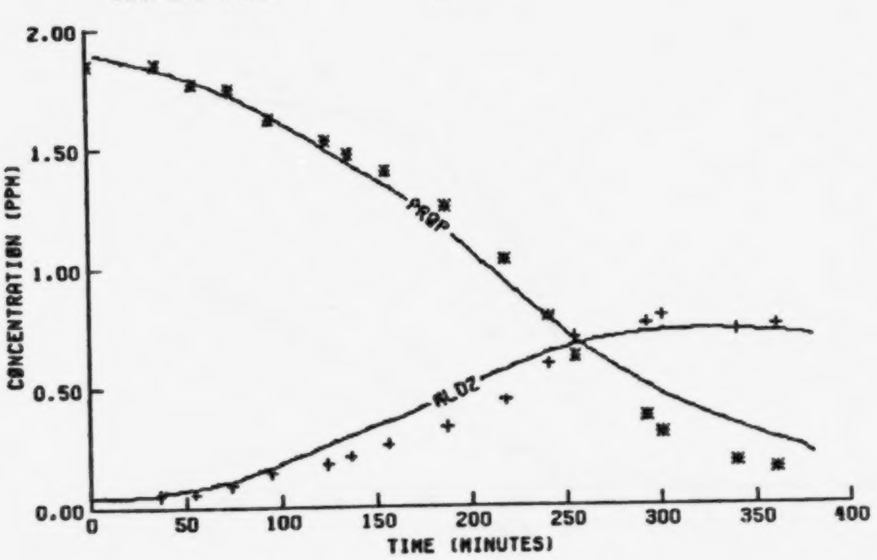

NAPCA-156
NO2 ×
NO +
O3 ✱
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
0
45
90
135
180
225
270
315
360
TIME (MINUTES)
NO2
NO
O3

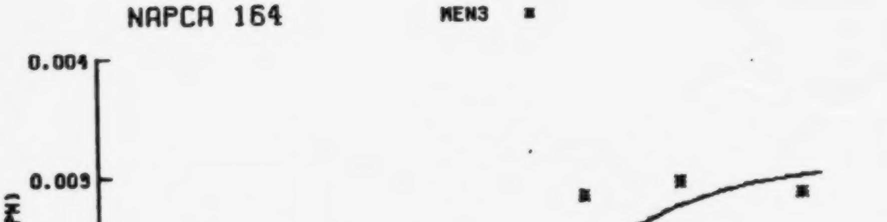

NAPCA-156
PROP ✱
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
0
45
90
135
180
225
270
315
360
TIME (MINUTES)
PROP

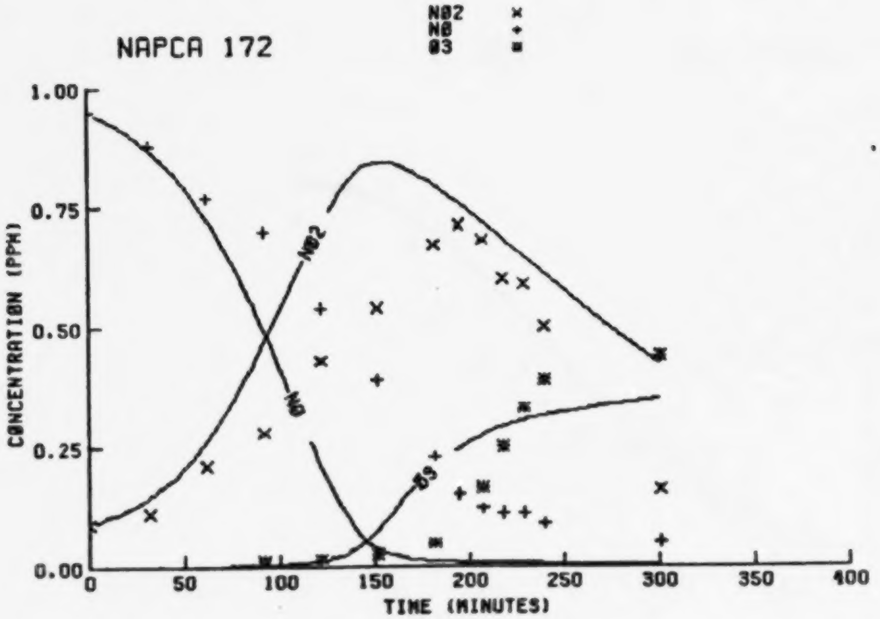

NAPCA-156
PAN ×
ALD2 +
FORM ✱
1.20
0.90
0.60
0.30
0.00
CONCENTRATION (PPM)
0
45
90
135
180
225
270
315
360
TIME (MINUTES)
FORM
ALD2
PAN

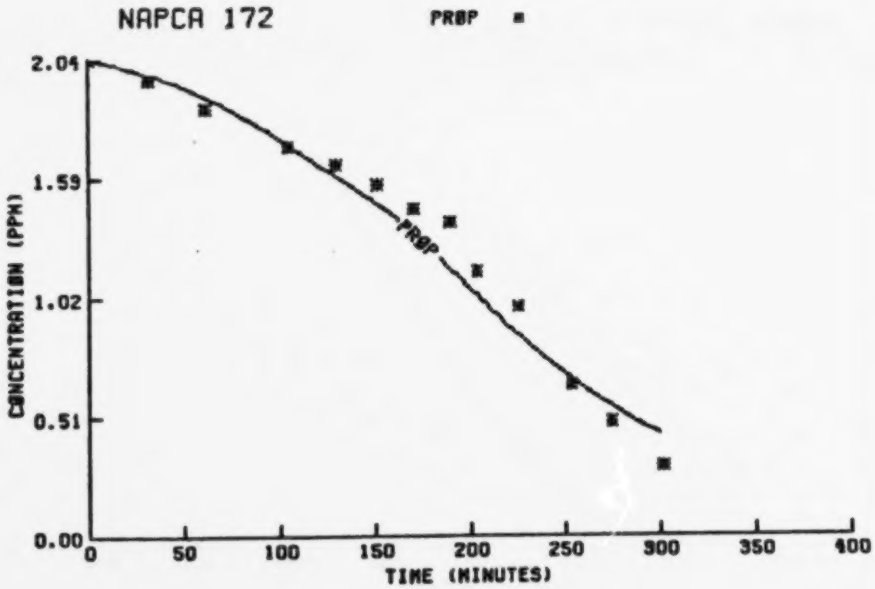

NAPCA 164
PAN +
O3 *
0.40
0.30
0.20
0.10
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
O3
PAN

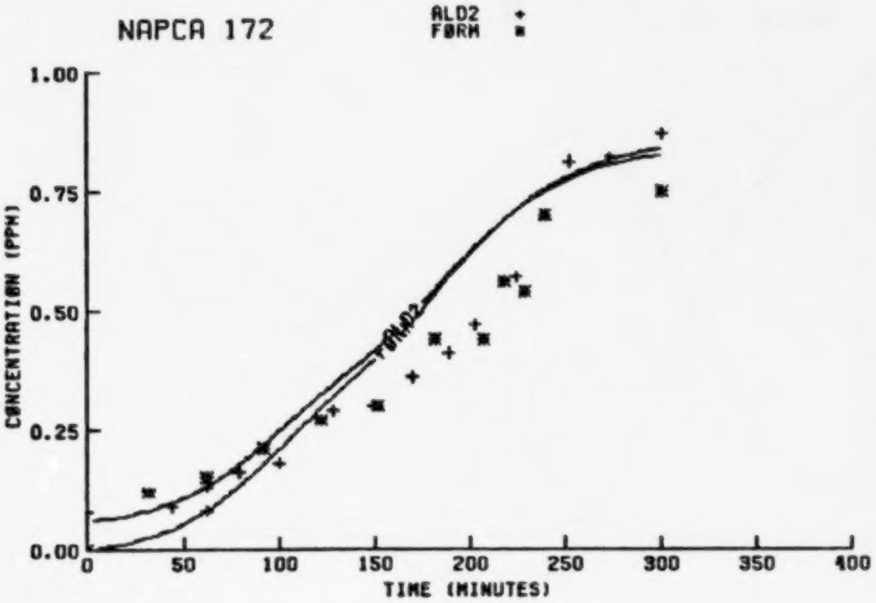

NAPCA 164
FORM ×
NO2 +
NO *
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
FORM

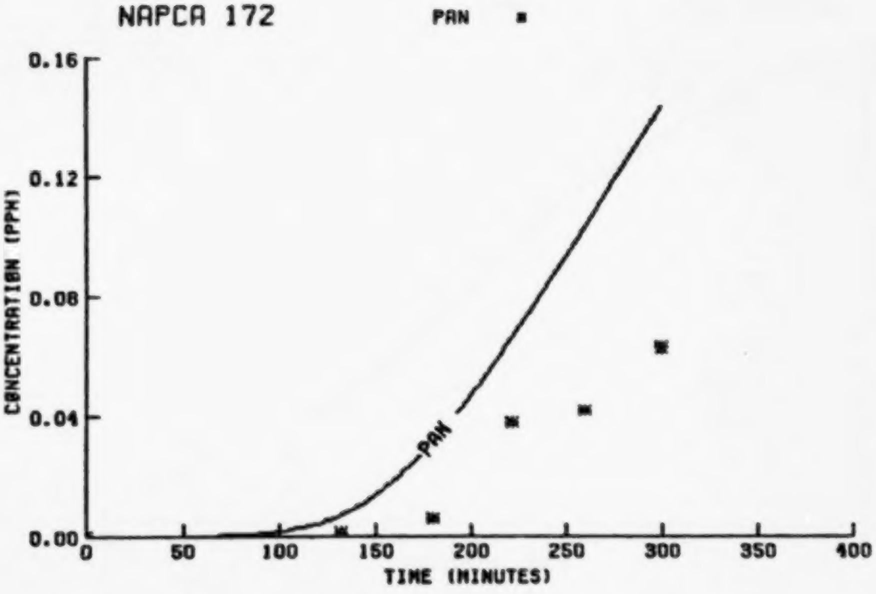

NAPCA 164
ALD2 +
PRØP ✱
CØNCENTRATIØN (PPM)
2.00
1.50
1.00
0.50
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PRØP
ALD2

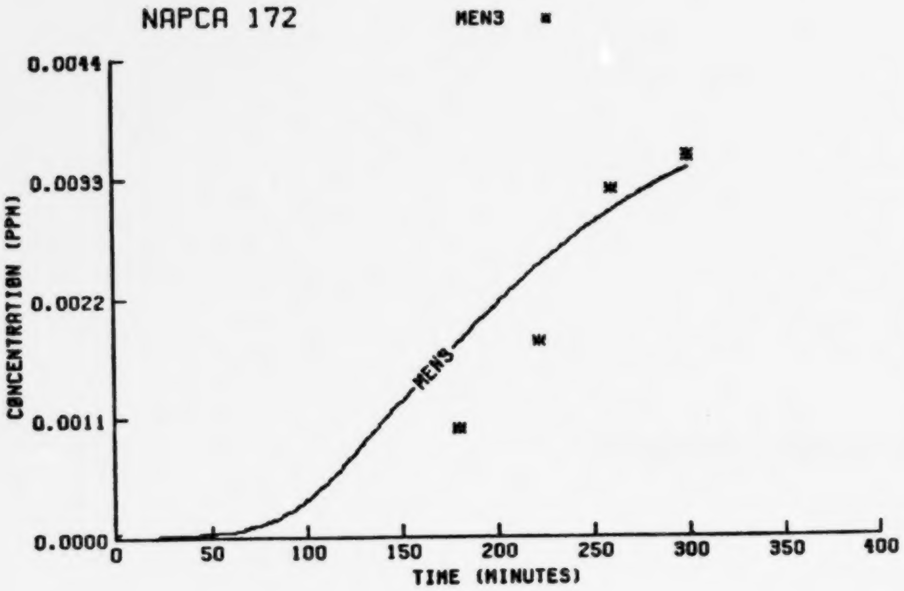

NAPCA 164
MEN3 ✱
CØNCENTRATIØN (PPM)
0.004
0.003
0.002
0.001
0.000
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3


NAPCA 172
NO2 ×
NO +
O3 ✱
1.00
0.75
0.50
0.25
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
NO2
NO
O3

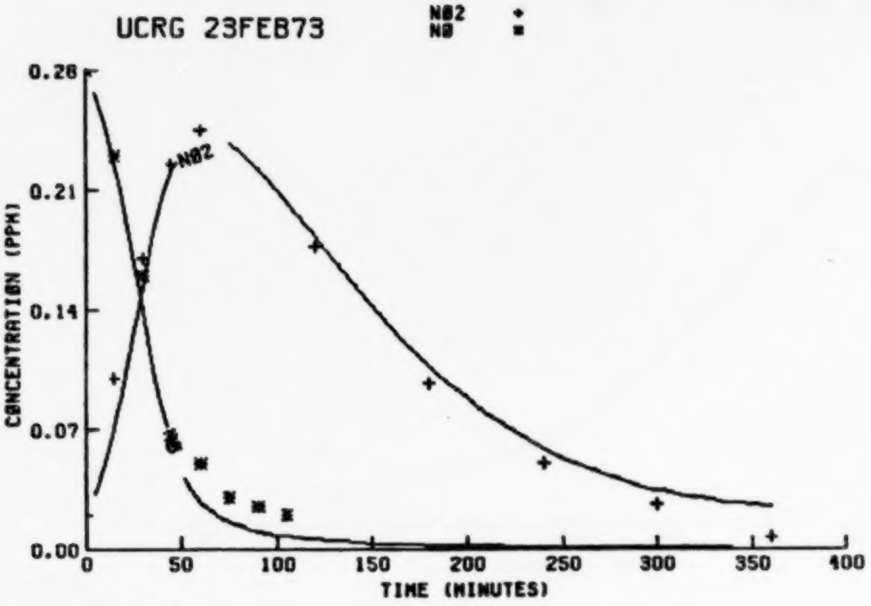

NAPCA 172
PROP ✱
2.04
1.53
1.02
0.51
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PROP

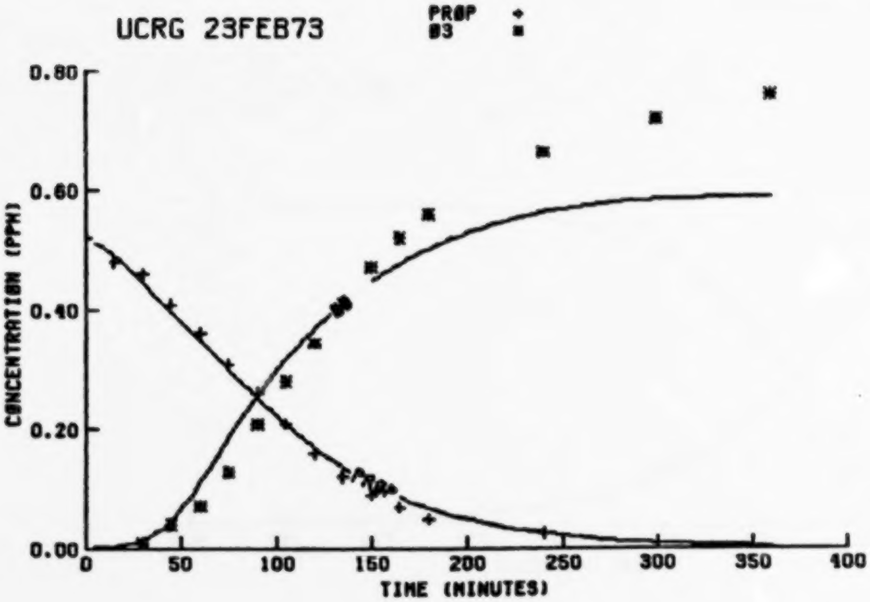

NAPCA 172
ALD2 +
FØRM ✱
CØNCENTRATIØN (PPM)
1.00
0.75
0.50
0.25
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
FØRM
ALD2

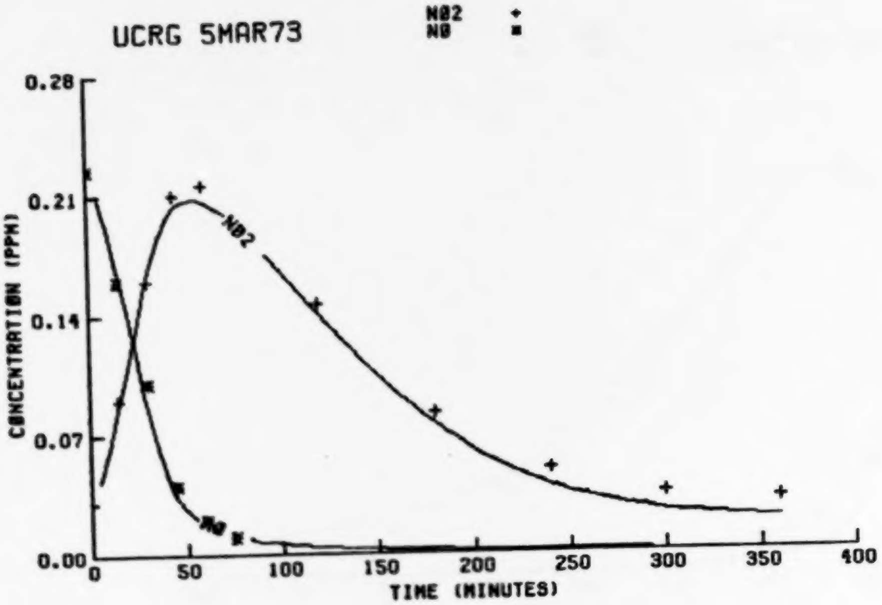

NAPCA 172
PAN ✱
CØNCENTRATIØN (PPM)
0.16
0.12
0.08
0.04
0.00
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
PAN

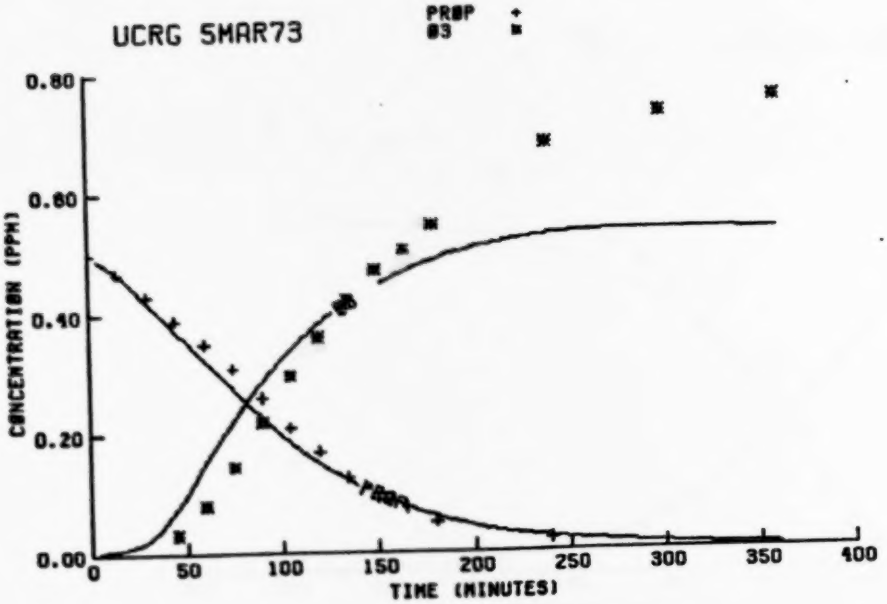

NAPCA 172
MEN3 ✱
0.0044
0.0033
0.0022
0.0011
0.0000
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)
MEN3

UCR-AGC CHAMBER EXPERIMENTS

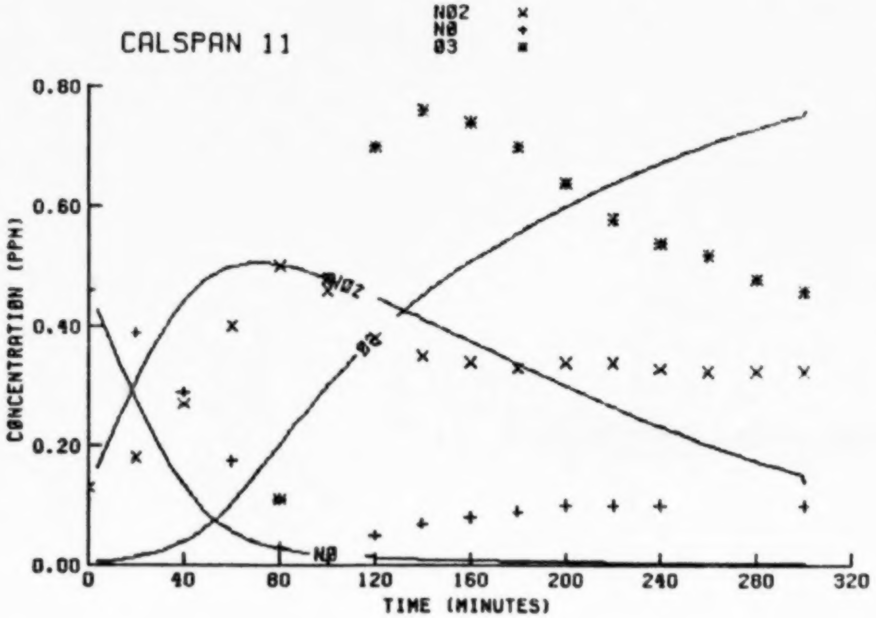

UCRG 23FEB73
NO2 +
NO ✱
NO2
0.28
0.21
0.14
0.07
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

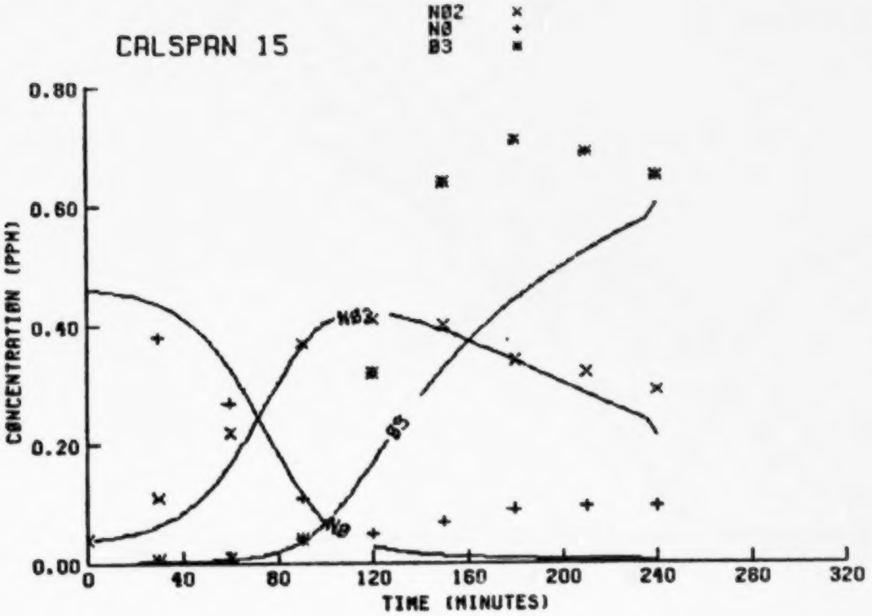

UCRG 23FEB73
PROP +
O3 ✱
PROP
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

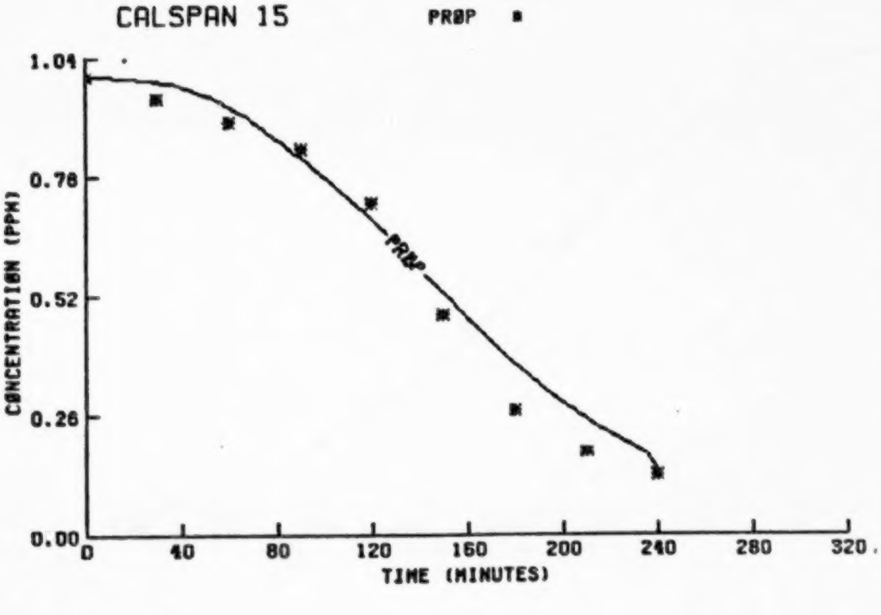

UCRG 5MAR73
NØ2 +
NØ ✱
CØNCENTRATIØN (PPM)
0.28
0.21
0.14
0.07
0.00
NØ2
NØ
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

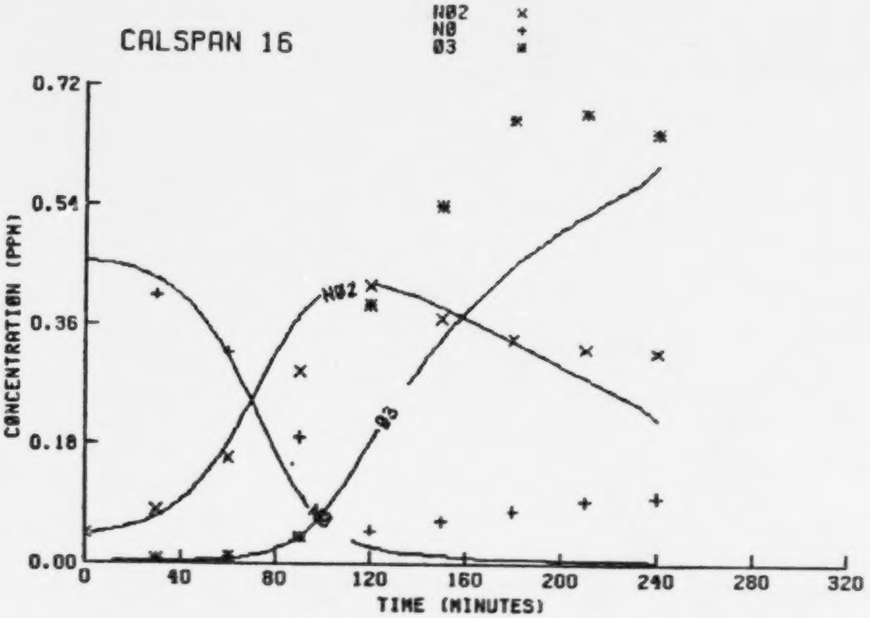

UCRG 5MAR73
PRØP +
Ø3 ✱
CØNCENTRATIØN (PPM)
0.80
0.60
0.40
0.20
0.00
Ø3
PRØP
0
50
100
150
200
250
300
350
400
TIME (MINUTES)

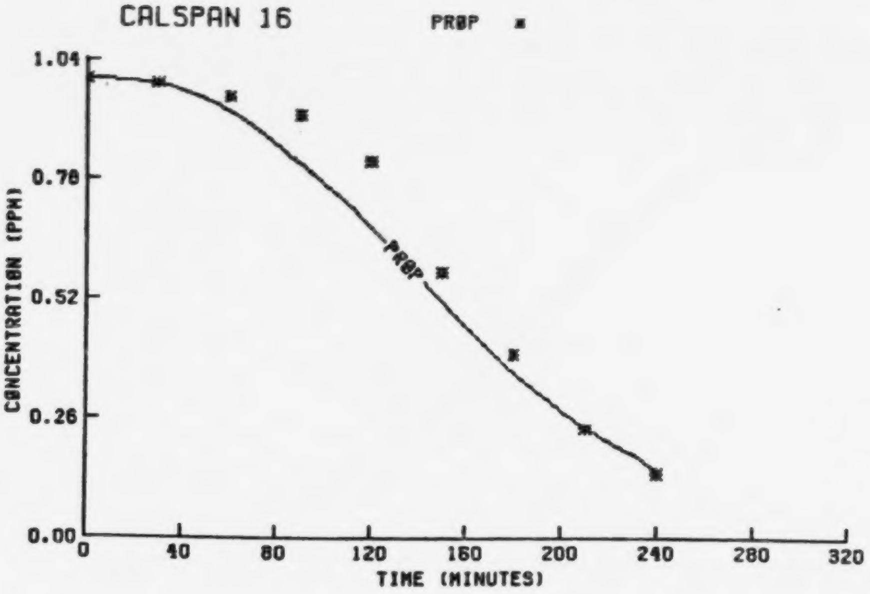
CALSPAN CHAMBER EXPERIMENTS


CALSPAN 11
NO2 ×
NO +
O3 ✱
CONCENTRATION (PPM)
0.00
0.20
0.40
0.60
0.80
TIME (MINUTES)
0
40
80
120
160
200
240
280
320
NO2
O3
NO

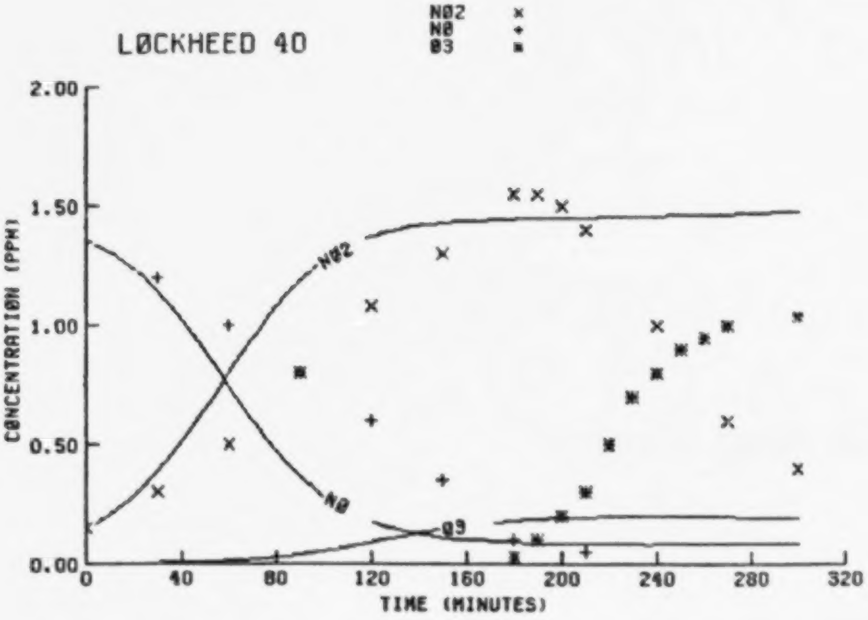

CALSPAN 15
NO2 ×
NO +
O3 ✱
0.80
0.60
0.40
0.20
0.00
CONCENTRATION (PPM)
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
NO2
NO
O3

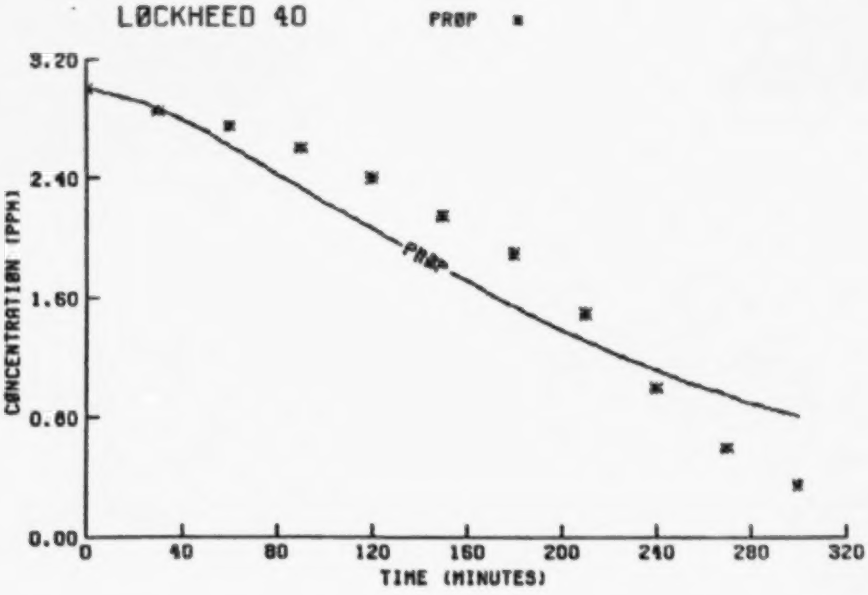

CALSPAN 15
PROP ✱
1.04
0.78
0.52
0.26
0.00
CONCENTRATION (PPM)
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
PROP

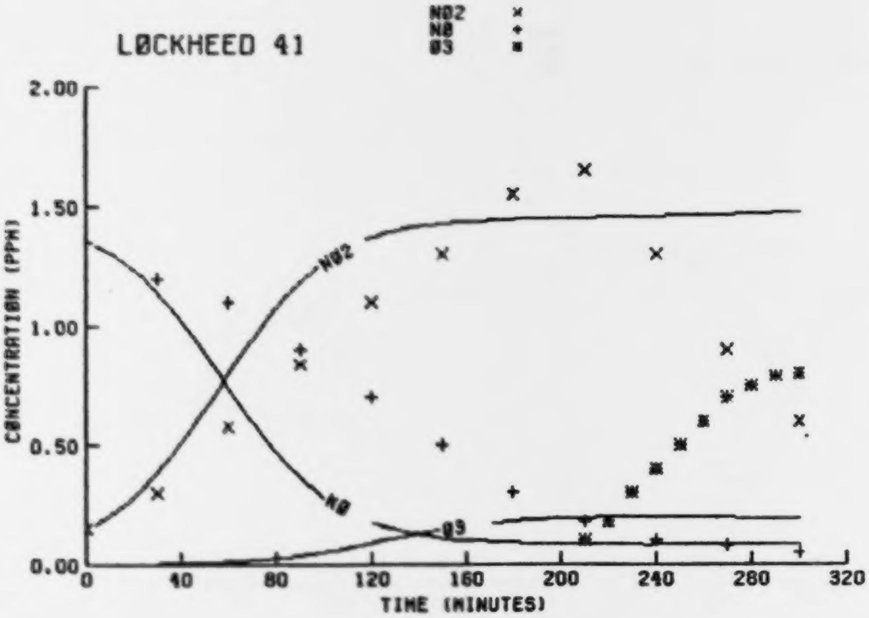

CALSPAN 16
NO2 ×
NO +
O3 ✱
0.72
0.54
0.36
0.18
0.00
CONCENTRATION (PPM)
NO2
O3
NO
0
40
80
120
160
200
240
280
320
TIME (MINUTES)

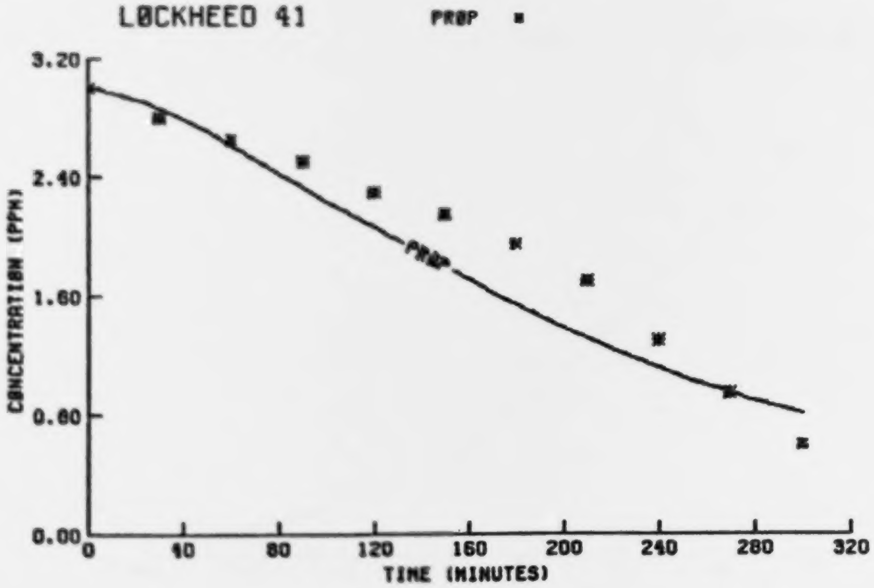

CALSPAN 16
PROP ✱
1.04
0.78
0.52
0.26
0.00
CONCENTRATION (PPM)
PROP
0
40
80
120
160
200
240
280
320
TIME (MINUTES)

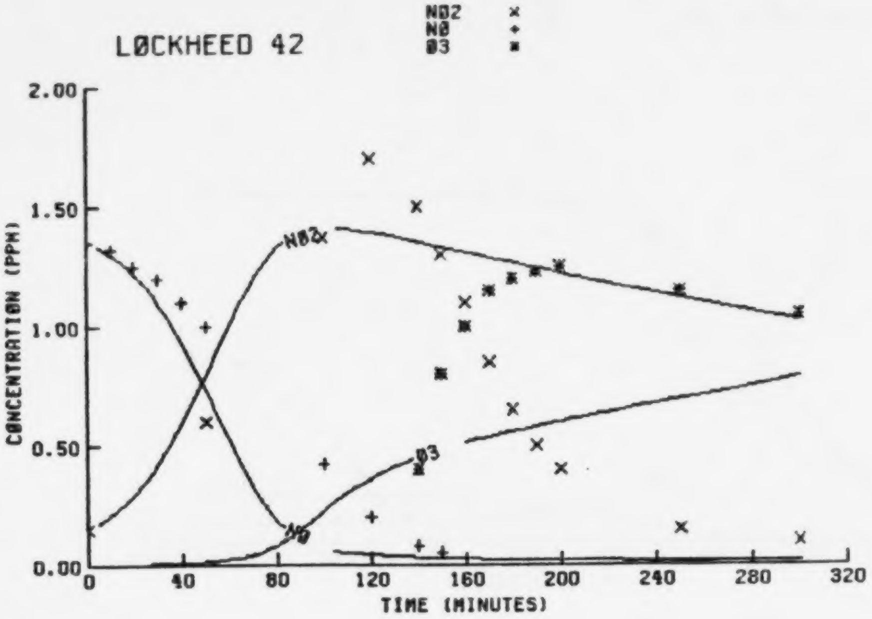
LOCKHEED CHAMBER EXPERIMENTS

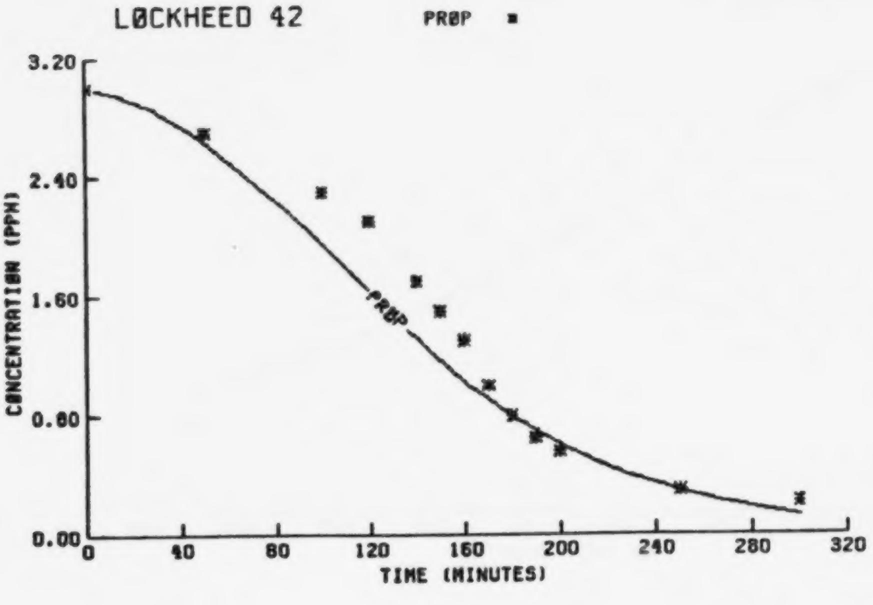

LOCKHEED 40
NO2 ×
NO +
O3 ✱
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
NO2
NO
O3

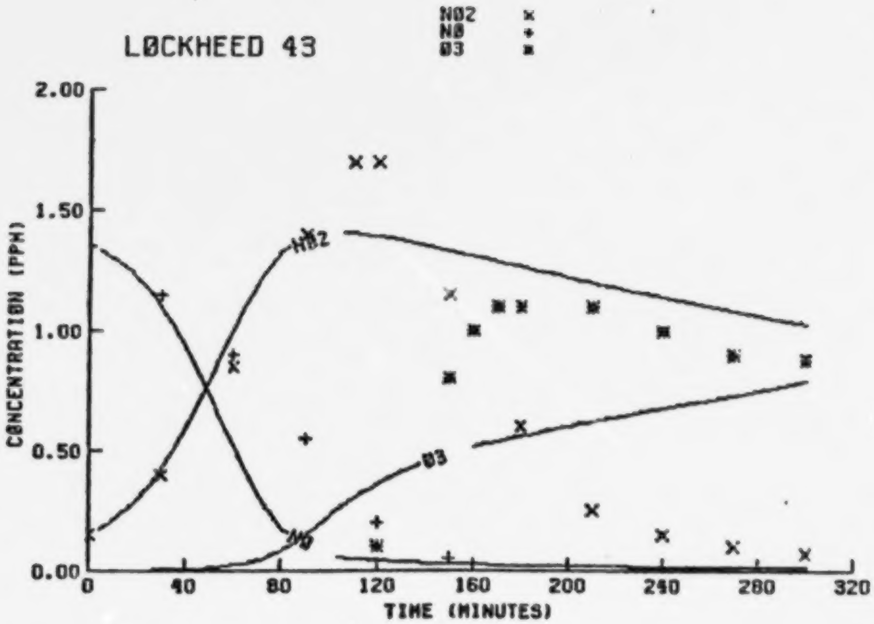

LOCKHEED 40
PROP ✱
3.20
2.40
1.60
0.80
0.00
CONCENTRATION (PPM)
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
PROP

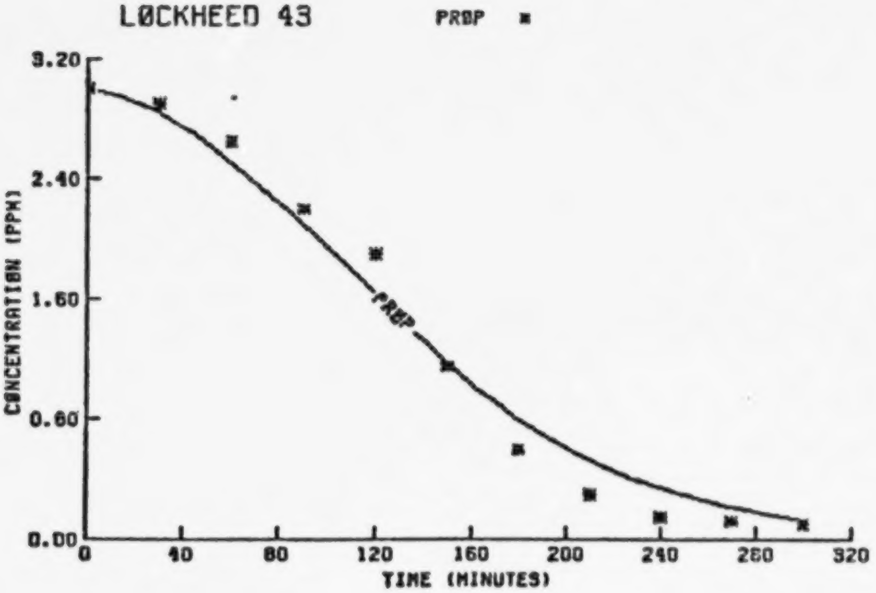

LOCKHEED 41
NO2 ×
NO +
O3 ✱
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
NO2
NO
O3


LOCKHEED 41
PROP ✱
3.20
2.40
1.60
0.80
0.00
CONCENTRATION (PPM)
0
40
80
120
160
200
240
280
320
TIME (MINUTES)
PROP


LOCKHEED 42
NO2 ×
NO +
O3 ✱
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
NO2
O3
NO
0
40
80
120
160
200
240
280
320
TIME (MINUTES)


LOCKHEED 42
PROP ✱
3.20
2.40
1.60
0.80
0.00
CONCENTRATION (PPM)
PROP
0
40
80
120
160
200
240
280
320
TIME (MINUTES)


LOCKHEED 43
NO2 ×
NO +
O3 *
2.00
1.50
1.00
0.50
0.00
CONCENTRATION (PPM)
NO2
NO
O3
0
40
80
120
160
200
240
280
320
TIME (MINUTES)


LOCKHEED 43
PROP *
3.20
2.40
1.60
0.80
0.00
CONCENTRATION (PPM)
PROP
0
40
80
120
160
200
240
280
320
TIME (MINUTES)